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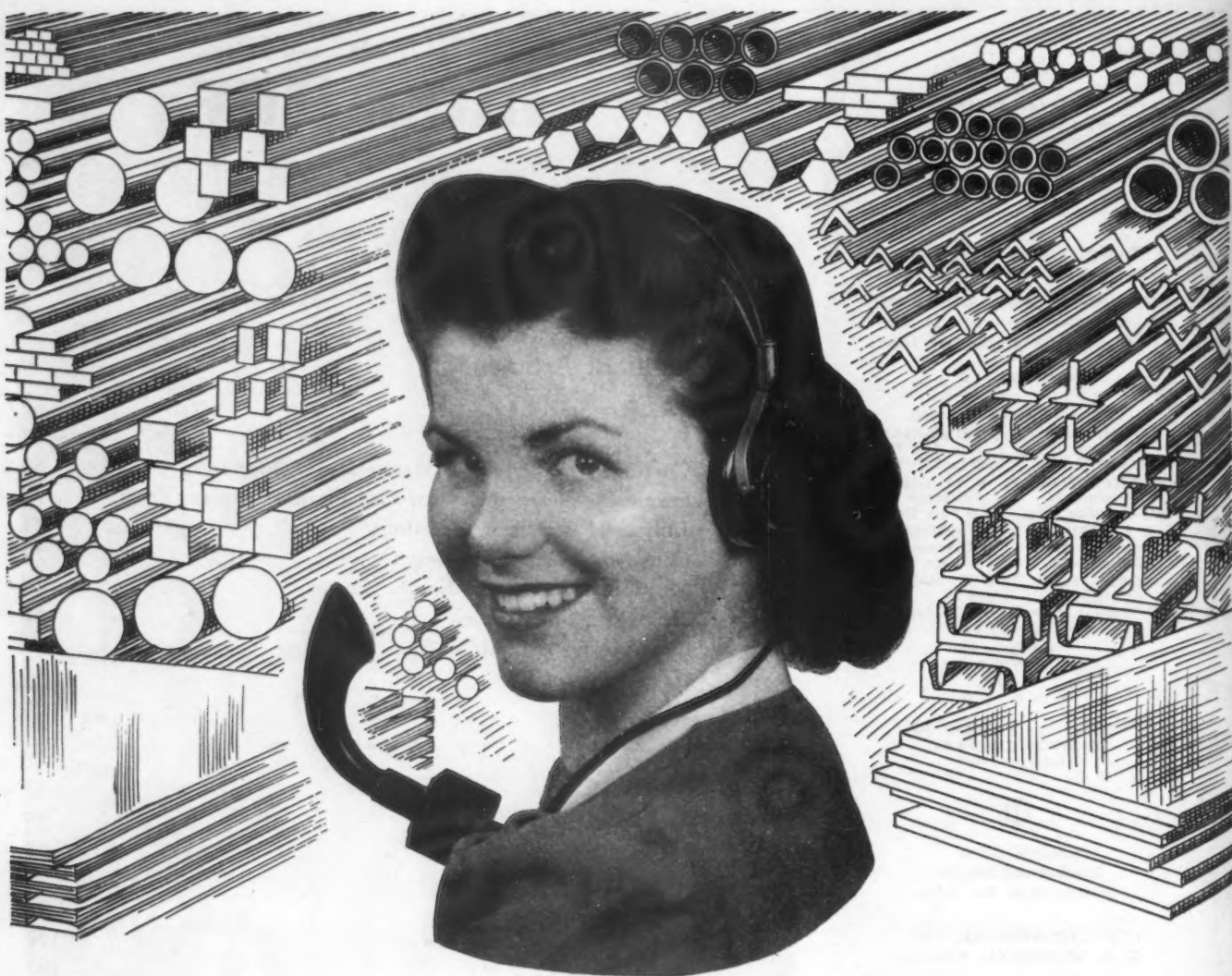
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TOO LITTLE and TOO LATE

SHORTAGES lose wars. Overages never do. That is something to keep in mind in connection with the current fuss and furor concerning the question of shifting back to civilian goods production.

One of the reasons, for example, that Germany was obliged to sue for an armistice in 1918 was her shortage of liners for field guns. Not that this particular shortage won the war for the Allies. For had it not been that shortage, it would eventually have been another.

Yes, we shall have a tremendous surplus of some items of war materiel and other products ordered for the Army, the Navy and the Maritime Commission left over on V-Day. That is something that we should rejoice in instead of complain about. The nation that loses this war will not have a surplus to worry its people.

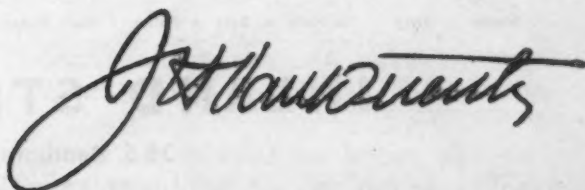
Germany, for example, will have no surplus of fighting aircraft after this war. We, on the other hand, may actually be obliged to scrap many thousands of perfectly good planes because we shall have too many of them and because design changes will make them obsolete in a few years' time. Most of our war planes are one purpose mechanisms that cannot be economically converted or used for peace purposes. And experts tell us that less than 6000 planes, or about a month's production at our present rate would saturate the entire world market for commercial transportation.

Theoretically, I suppose, in a perfectly planned war the last bullet will have been manufactured and shipped in time to kill the last Jap or German on the last battlefield, on the last day of the conflict. And so on with the thousands of other items which are expendable in war. Unfortunately no human mind has the power to prevision when the last day will come or where the last battlefield will be. And we must remember that the Allies have begun to win on the battlefields of Europe only during a very few recent months.

So in this present conflict of opinion at home between those who want a quick resumption of civilian goods manufacture and the Army and Navy who want to make sure that we shall have more than enough to finish the job, my sympathies are with the latter.

If there is any item of which we shall have just enough and no surplus when the war ends, then some procurement officer has been remiss in his job and has gambled with the fate of the Nation. No man or group of men can plan in detail the strategy and requirements of a world war with its shifting center of gravity. It is only during the last few months before victory that the pattern begins to clear and no general staff however capable and no commander-in-chief however omniscient can prevision the shifting vicissitudes that a war of this duration and magnitude is bound to bring.

So let us be patient a little longer and rejoice that we shall have too much soon rather than too little and too late.



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NEWS FRONT

➤ That NE steels will be discarded by the automotive industry just as soon as full alloy steels will be made available, is the opinion of a prominent automotive engineer.

Automotive manufacturers fear that obtaining deep drawing sheets will be one of their greatest reconversion problems. The residual alloys in the steel scrap in the country will make steel sheets so brittle as to preclude their deep drawing. The steel producers are confident, however, that they will be able to supply auto builders with the necessary material.

➤ First aircraft company to announce its intention of entering the automotive field is Consolidated Vultee whose plans for a super-bus were revealed recently.

➤ The huge flying boat under construction by Howard Hughes (originally one of Kaiser's enterprises) will take off in from six months to a year, according to Hughes. He also insists that he will build a huge land plane, by far the largest ever constructed, as soon as materials become available.

➤ A postwar railroad dining car, to be offered by Pullman Standard Mfg. Co., will have diagonal seating (to eliminate interruptions by arrivals and departures), vibrationless tables, spot-ray illumination, and small tables for tete-a-tete dining for two.

➤ Nearly two-thirds of the more than \$4 billion spent for war time industrial facilities in the midwest was spent for equipment, and one-third for structures.

One reason for current difficulties in securing adequate labor in the midwest is that that section was a Johnny-come-lately to the war effort. Very few facilities there were completed by the close of 1942, the expansion at that time amounting to less than 8 per cent of the district's present total, compared with nearly 60 percent completed at that time for the nation.

➤ Of all government financed plant and equipment expansion in the nation, DPC has financed 43 percent, Army 32 percent, Navy 20 percent, Maritime Commission 3 percent, and other agencies 2 percent.

➤ Surplus stocks of steel continue to grow, but they are overwhelmingly dominated by narrow strip of unusual specifications. Merchant bars of a wide variety of shapes and sizes run a poor second. The situation is evidence that perhaps surplus stocks will constitute little threat to future steel production.

➤ Lend-lease aid from the United States to its allies for the period from March 11, 1941 to June 30, 1944, totaled \$28,270,351,000, or 15 percent of all defense and war expenditures. In addition, approximately \$700,000,000 worth of supplies were assigned to U. S. commanding generals in the field for subsequent lend-lease transfer to allied forces.

For the same period, reverse lend-lease supplies and services furnished American forces and merchant shipping overseas amounted to over \$3,000,000,000, with the bulk coming from the British Commonwealth.

In commenting on reverse lend-lease aid, L. R. MacGregor, director of general war procurement supplies for Australia, believed it impossible to balance lend-lease receipts. There is no mathematical formula whereby anyone could possibly tell who owes who what after the war.

➤ Under the WPB order of July 29 automotive companies have begun to place orders for machine tools without waiting for DPC equipment to be made available. Average delivery time is 18 weeks, but good promises on special machines have not been forthcoming.

➤ Postwar existence of the Geneva Steel Co. can be insured only if the government should decide to sell the plant for a fraction of the \$190 million it has invested. However, if the government does cut its price, it will be accused of throwing away taxpayers' money for the benefit of a private buyer.

➤ A survey conducted in Detroit by the research department of the UAW reveals that of the 447 war plants polled, 167 have received cutbacks. As a result employment has dropped from the peak of 925,000 to about 775,000.

➤ Grumman's new F7F-1 two-motor, carrier-based fighter plane will be known as the Tigercat. A contest held among the company's employees resulted in two prize winners. Bearcat, the other winner, will be held for some future plane.

Western Steel

A Riddle of Uncertainties . . .

B. F. FAIRLESS, president of the United States Steel Corp., expressed doubts about the postwar Pacific Coast steel market in San Francisco three weeks ago. He pointed out that steel consumption in the Far West had increased to 6,700,000 tons annually during wartime, but that 3,000,000 tons of this was plates, mostly for shipbuilding.

As for the U. S. Steel Corp. operated Geneva plant, he said, "We have no option to buy, lease or otherwise continue production there after the war. However, this does not mean that we wouldn't be interested in operating the plant in the postwar days if Western consumption warranted it and if we could obtain it on the right basis."

He said he didn't know whether the U. S. Steel Corp. could operate the plant at a profit, pointing out that the capacity now is much greater than the consumption in any prewar year.

Some three years earlier B. F. Fairless told his friends, when the decision had been made by the government to construct a huge, fully integrated steel plant in Utah, "We will build the best plant we know how as quickly as possible. We will build it without a cent of profit, and irrespective of the corporation's own interests. No one will ever be able to say that we had any selfish motives in constructing this plant and that we didn't do our best to make it operate as satisfactorily as possible."

Only three weeks before Pearl Harbor, members of the steel industry, called to Washington, had been told that the plan was to build blast furnaces, raw and semi-finished steel facilities in Utah to take advantage of the superior raw material facilities there. Finishing facilities would be constructed at San Francisco Bay in or near the plants operated by Bethlehem and Columbia, the Steel Corporation subsidiary. Needs of the shipbuilding industry then were such that this arrangement would suffice to relieve the burden of the Eastern mills. A proposal by Henry J. Kaiser, West Coast shipbuilder and contractor, who

. . . Much of the speculation about the future of the Geneva steel plant goes deeper than concern whether Western steel consumption will be sufficiently great to warrant its existence after this emergency period. The Geneva plant has now become a symbol of the postwar threat of DPC plants to those which have been built and nurtured by private industry. Being a high cost producer, it can maintain its competitive position only by some form of government subsidy. This article appraises Geneva's potentialities and comes to conclusions in opposition to those of Geneva enthusiasts like Dr. J. R. Mahoney, an abstract of whose report will appear next week.

had recently promoted government funds for a magnesium plant, had been tabled. An earlier proposal by Bethlehem to erect a fully integrated plant, with two blast furnaces at Los Angeles, had been turned down following objections from the War Department.

When the Japs unleashed their initial terrifying power, the crotch of the Steel Corp. plant was tied to form a single plant in Utah, far from the Coast. Somehow, military security objections to the Kaiser proposal were overcome, and approval given first to build a blast furnace, and later, bit by bit, a full fledged steel works and mill at Fontana, 80 miles east of Los Angeles.

Although President Roosevelt more than once had let it be known that he felt decentralization of the steel industry westward would be a good thing on general economic, and presumably, political principles, all of this expansion was tagged as strictly an emergency measure necessitated by wartime demands of Pacific Coast industries, notably shipbuilding. The fact that early Japanese successes caused the Steel Corp.'s plant to recoil from the Coast so far that its tail rubbed the Rocky Mountains, was incidental. This plant faced the Pacific Coast.

The Fairless vow was carried out to the letter. Defense Plant Corp., which proclaims that it is an "instrumentality of the United States Government" on everything from paper clips to power houses, made the U. S. Steel Corp. subsidiary, Columbia Steel Co., agent without fee to build the new

plant. So conscientiously was the construction operation divorced from normal Steel Corp. activities that offices from which the project was masterminded were located in a separate office building from the corporation's own offices in Chicago. With no consideration necessary for adjacent facilities, building of the plant from the grass roots was a steel engineer's dream. Plans called for 252 by-product coke ovens, three 1100-ton blast furnaces, nine 225-ton open hearths, a 45-in. blooming and slabbing mill, a 132-in. plate mill, a 28-in. blooming mill and a 26-in. structural mill.

Actual building of the plant was a battle all the way, with equipment delivery schedules disrupted by diversion of equipment to other projects as far away as Russia, and other unavoidable contingencies plaguing every step. Before the first units of the plant were ready for operation, a new Steel Corp. subsidiary, Geneva Steel Co., was formed to operate the plant without fee for DPC. Assigned to active duty with this new company were the corporation's best management brains, with Walter S. Mathesius, vice-president in charge of operations for the entire corporation, as president.

This Rolls Royce of the steel industry as yet operates on only two cylinders. Although no moss grows on pig iron destined for West Coast shipment, only two of the blast furnaces have been blown in. Instead of 2200 tons of pig iron per day, they are together producing only 1300 tons. Only three of the open hearths are melting,

and instead of the anticipated 2500 tons of plates daily for the Coast shipbuilders, only about 600 tons daily are being produced. The structural mill, whose construction was temporarily halted last December because of a then anticipated satiety of shapes, has just commenced to operate, producing billets for Kaiser's shell forges at Denver. The big bug in the Geneva ointment is lack of manpower, with only about a half a crew on the job.

From the day in 1941, when Walter S. Tower, president of the American Iron and Steel Institute, said of the steel expansion program that "it may come too late to have any value in the present problem," and "it is extremely doubtful whether any measurable effect could be expected before the end of 1944, if then," there have been doubters who felt the Geneva plant never could reach capacity operations in time for peak war demand. As a corollary some went on to say that if the plant did not reach capacity operations during the war, it *never* would because of the limited Far Western markets for its present or potential finished steel products.

Don't misunderstand. No one quibbles over the plant's being a beautiful modern piece of steel making machinery. Allegorically it is said that a Rolls Royce is a beautiful piece of machinery, too, but you wouldn't use a Rolls Royce to draw a peanut wagon if you wanted to make money on your peanuts.

Additional Facilities Necessary

At the opposite extreme, enthusiasts see a rosy future for Geneva. They would add \$30 or \$40 million to the \$190 million already spent to more nearly shape the finishing facilities to the normal market needs of the surrounding area. The mill now is equipped to turn out 700,000 tons of plates and 200,000 tons of shapes. By the addition of a slab squeezer, two more finishing stands, coilers and accessory units the hot rolled strip and sheet market could be invaded. Addition of cold reduction facilities, with an eye on the substantial West Coast tin plate market and whatever cold-rolled strip demand could be drummed up, has been described as "the most significant step that could be taken to achieve more nearly full scale utilization of the units already established and to meet the specialized needs of the western market." The structural mill, it is said, could be supplemented by a seamless tube mill to tap the oil country market in California, the Rocky Mountain states, Oklahoma and Texas. Less speculatively, the structural mill is in an ideal position to roll

rails, and this is a point which should be kept in mind for later discussion.

Return to a competitive steel market in the Far West certainly will bring awakening from dreams based solely on metallurgical and productive feasibility, however, these, if carried to an inductive conclusion, would have a fully integrated plant at the North Pole using Alaskan lignite and pyrites deposits to make electrical sheets and piano wire.

The postwar nature of the steel industry serving the Pacific Coast can only be determined when water transportation is available through the Panama Canal from Sparrows Point and Birmingham and when the price and quantity of scrap available at Pacific Tidewater for mills located

there becomes apparent. Before the war, better grade open-hearth scrap ranged from \$8.50 in depression depths to \$16.50 per net ton, when Japanese competitive buying pressure became heavy.

Those who would toss an apple of discord into the Eden of scrap supply which was the Pacific Coast before the war, point out that the region west of the Continental Divide now has nearly 3½ million net tons of ingot capacity compared with a little over a million before the war. Therefore, they insinuate, the demand for scrap should push the price upwards materially making 100 per cent scrap operation economically unfeasible. It develops, however, that 1,280,000 tons of this capacity is at Geneva, which



FIG. 1—Nearly 18,000,000 tons of high grade ore has been removed from the Sunrise Mine of Colorado Fuel & Iron Corp., at Sunrise, Wyo. Commercial operations were first by open pit then by milling pit until depth made further development along these lines impossible. Ore now is removed by underground mining and a new 800 ft. shaft is being completed to permit further exploitation.

is not geographically situated to draw scrap from the happy hunting grounds of the Coast, and that 720,000 net tons is at Fontana which has its own blast furnace. Actually the old line mills on the Coast whose melt is close to 100 per cent scrap have added less than 250,000 net tons to their capacity. About one-half of this is in the Pacific Northwest which has been overflowing with scrap. Most of the balance is in the San Francisco district where scrap supplies never were a problem. Only if Kaiser veered sharply towards an extremely high scrap melting ratio, which is not beyond the realm of possibility, would the market be upset. Even then, the price impact would be heaviest in southern California, always a pre-war plus-scrap area, and to some extent in central California. If the Pacific Northwest were tapped by coastwise vessels, there is little doubt that the entire Coast industry, Kaiser and all, could be comfortably supplied. There is a tendency among those who foresee the end of the Coast scrap abundance to regard scrap as some sort of a mineral whose supply is exhausted once it is mined. These same people, strangely enough, are the ones who foresee a big demand for steel on the Coast for heavy industry and even shipbuilding, the very industries which will leave the Coast with a big scrap stockpile the day the war ends. Before this great day many of the boys coming back from the Pacific War zone will testify first hand that Japan found our West Coast scrap resources far in excess of the demands of the pre-war mills there.

Too much of the thinking concerning Far Western steel production, particularly on Capitol Hill, is trussed in the Census Bureau strait-jacket that the 11 Western states contain about 12 per cent of the nation's population and only 5 per cent of its steel making and finishing facilities. The concept is passed over a numerical grizzly, which shifts out the fact that the Far West may normally be expected to consume around 400,000 tons of tinplate. Completely ignoring trade customs in the purchase of tinplate, which to a large degree became a matter of public record with the TNEC hearings, it is then argued that Geneva, Kaiser or some sponge iron plant yet to be constructed can economically add a continuous strip mill, cold reduction facilities, and an electrolytic tinning line to supply this entire need. Likewise, there is a tendency to look at the book and note that the tubular products market in the 11 Western states, mostly California, ran nearly 700,000 tons annually before the war. On this

basis, and without conscience, a seamless tube mill is installed, backed up by only 200,000 tons of structural mill capacity.

These statistical meanderings, which fail to appraise realistically a probable market for any one mill, take little notice of the minimum volume required to produce such items as hot-rolled strip or tubular products upon a competitive basis. Only cursory examination is made of the numerous finished items such as tarpaulin headings as "tubular products" or "flat rolled products." In few other industries does unit cost come so close to declining in geometric ratio beyond the break-even point as the steel industry; yet this point almost universally is overlooked in appraising the policies of competing Eastern firms which ship to the West Coast.

Overhead Must Be Reduced

Under only one condition can a Rolls-Royce be used economically to draw a peanut wagon. If it can be bought as distressed merchandise, at a price far less than a more economical power unit, so that the overhead does not eat up the returns from peanut sales, the use of fine equipment no longer is a luxury.

As Geneva stands today, it represents a capital investment—Uncle Sam's capital—of about \$148.44 per ton of ingot capacity. If finishing facilities were modified so that the plant could serve a more diversified postwar market, the figure would stand at \$175. No privately financed American steel company even approaches such a figure. United States Steel Corp., as a whole, in 1943, stood at \$47.96; Bethlehem at \$50.76; Republic, \$40.48; Colorado Fuel & Iron, across the Rocky Mountains from Geneva, \$32.16; and Kaiser, \$125. Such handicap, in itself, might be tossed off during years of capacity operation but, as the operating rate retreats to normalcy, it could well become an extremely oppressive ball and chain to a private operating company.

There are confirming indications that Geneva is expensive to operate unless capacity operation is achieved. Although on paper, and before the Geneva blast furnaces were blown in, the cost of raw materials per ton of pig iron was estimated at only \$10.85, the total cost of producing pig under present restricted operating conditions is somewhere near \$22.00 per ton. This high cost, of course, is a result primarily of the two big furnaces operating on slack wind blowing only 45,000 cu. ft. of air per min. instead of the 85,000 required for capacity operation.

Exceptions to maximum price regulation No. 6, the OPA schedule governing steel prices, give Geneva \$64.64 per gross ton f.o.b. Coast ports for forging billets, and \$3.20 per 100 lb. for hot rolled plates. The latter price will also apply to shapes. The billet price is \$12.64 per ton above the ceiling, representing competitive conditions, the plate price \$11 per ton, and structurals \$9 per ton.

OPA went to the tap root of Geneva's cost situation in explaining these exceptions, although it missed some of the rootlets which later developed with operating experience as mentioned above. The OPA said that Geneva's cost of production was "comparable to cost of other steel mills with the exception of depreciation which is considerably out of line because of the excessive cost of constructing such a facility in war time; that a further cost factor which must be considered is freight since this mill is located in an area where there is a very minor (sic) demand for steel," and that even these exceptionally high prices which it granted "do not appear adequate to cover the most of production."

If Geneva is not to become a post-war ghost, it is quite obvious that overhead must be reduced, and sufficient markets developed to enable operation at a profitable rate. The whole matter of government policy in disposal of government-owned plants is involved in the first consideration. If Geneva were sold to a private operator at a sufficiently low price, fixed charges could be reduced to a point where prices were sharply competitive. Lower prices could broaden the market geographically and the possibility emerges of a profitable operating rate. Disposal of the Geneva plant at any figure below the \$190 million which the government paid for it amounts, therefore, to a thinly veiled form of government subsidy.

Peculiarly, in the case of Geneva, such a subsidy could be viewed as an aid to the development of a whole geographic region. As in other parts of the country, however, this subsidy would wreak havoc with private capital invested in other firms attempting to capture the same markets.

The so-called Intermountain States never have felt any stigma attached to government subsidization of their mineral industries, although their thrifty, hard working residents individually are the type that would deign to hold out their hands for charity. Utah's Congressional representatives have talked so long and hard for "free" silver that it would be a simple matter to point out the advantages an almost

free steel plant would bring to that part of the country. If you can persuade yourself that a great industrial plant flourishing where only alfalfa grew before is a boon not only to the operating company but to all the citizens of a state, it is easy to overlook the fact that plants in neighboring states developed by private enterprise may be trampled upon. This reasoning is applied here to Utah, but so may it be with plants in Kansas, Kentucky and Carolina!

Utah economists urge that the excessive wartime cost in construction of Geneva, and the fact that its capacity is unbalanced with regard to products normally consumed by its market, should be reflected in a selling price sharply reduced below cost of construction. The correct price, it is argued by the Utahans, should be set at whatever is necessary to make the plant not only comfortably competitive, but to allow it to sell its products at such a low price that industry will be attracted to the area. To break up the plant, and ship its equipment to points at which it could be economically used, would be sacrilegious, they say. In other words, if a plant is not economic at the point and at the cost it was built by the government as a wartime stopgap, Uncle Sam should tug and haul until the plant is made economic by sheer force. We refer this happy thought to the Malamutes for possible use in connection with the Canol project.

Although the \$190 million Geneva,

Utah, steel plant was constructed as a monument to wartime demands of the Pacific Coast, the big plant inevitably will cast a larger shadow eastward as the Rising Sun sinks toward oblivion.

Contemplation of the shade which Geneva eventually may throw already is enough to make some firms in the Denver area reach for their coats. If Geneva is taken as the symbol of government-owned plants all over the country, the shadow that may chill the atmosphere for all private industry can easily be imagined.

The exact effect which Geneva will have upon the economy of the Rocky Mountain and western great plains states depends principally on three factors: (1) Price concessions which the government may make in its sale to a private operator or accounting shortcuts which the government may take if it operates the plant itself; (2) products which the plant will make, and (3) affiliations of the new owner with plants in other parts of the country and pricing policy which may be adopted.

Ingot Cost High

If the government should decide to sell Geneva for a fraction of the \$190 million which it has invested, the new owner will have in his hands a competitive weapon with which he may massacre plants which have been painstakingly built through the years with private capital and private sweat. From an engineering stand-

point Geneva is a powerful competitive shillalah, for it has been designed as a unit from the ground up with the finest and newest equipment available. Most plants install modern labor saving equipment only when it cuts production expense sufficiently to affect the capital outlay, often many years after the equipment is fully developed technologically. Geneva had no choice. Built with expensive wartime material and labor, its cost per ton of annual ingot capacity is so high that there is little likelihood that any commercial steelmaker willingly will assume a new venture of such high fixed cost in an uncertain market.

On the other hand, if the government cuts its price so that the buyer's investment in relation to ingot capacity is more nearly comparable to those of other plants, it could be accused of throwing away taxpayers' money so that a private buyer may be handed the best steelmaking equipment in the world to go forth and slay his enemies. The possibility of continued operation for government account by a private operator, such as is now being done by Geneva Steel Co., United States Steel Corp. subsidiary, presents such a complicated range of possibilities when price competition again appears, that it has no place in normal speculation.

C. F. & I. No War Baby

Although Geneva has been decked with tinsel and glamor because of its spectacular rise from the desert floor,

FIG. 2—Main plant of Colorado Fuel & Iron Corp. at Pueblo, Colo.



it is not generally realized that the Colorado Fuel & Iron Corp. plant at Pueblo, Colo., couched close along the eastern Rocky Mountain slope, is comparable in ingot capacity, being 1,121,000 net tons as against Geneva's 1,280,000. No war baby by any stretch of the imagination, C. F. & I. has come up the hard way over a period of 72 years, until it now places Colorado ninth among the states in steel production.

From the day in 1882 when the first heat of steel was rolled into rails for the Denver & Rio Grande Western Railroad, the Colorado plant's destiny has been closely tied up with the railroad industry. The founder, Gen. William J. Palmer, who had set out to build a railroad from Denver to Mexico City, wanted to avoid the heavy cost of hauling track material half way across the continent, and like other railroad men of his day, was closely bound up with promoting general industrial developments. No less an industrial giant than John D. Rockefeller was sold on the idea that the Far West would enjoy a railroad building spree paralleling the sprawling railroad systems of the Midwest and East, and gained control of the plant shortly after the turn of the century. To this day, control of the company lies with the Rockefeller interests. Incidentally, Rockefeller's visions did not stop in Colorado, and the company acquired iron ore deposit in California. Title to the largest of these, the Iron Chief deposit in the Eagle Mountains, after passing through other hands, recently came to rest in the hands of Kaiser Co., Inc., and it is hoped will eventually feed the Kaiser mill at Fontana.

Currently, the Iron Chief deposit is owned in fee by Kaiser but the Riverside Iron & Steel Co., of which Harlan Bradt is the president, in 1942 acquired a 10-year lease and purchase agreement on the property from the previous owner. Thus, unless Kaiser can make satisfactory terms with the Riverside organization (which he has been unable to do thus far) he is barred from mining ore on the property until the middle of 1952, presumably long after his present Vulcan deposit has been exhausted. The Iron Chief deposit is said by some to contain over 90 per cent of all the ore economically available to the Fontana plant.

Although the Far Western railroad network never fully materialized, the C. F. & I. Pueblo mill during the last war enjoyed the twin advantages of a modern plant and high prices to underwrite a tidy period of prosperity.

With approximately two-thirds of

the plant's capacity in rails and accessories, full operation at \$59 a ton for open hearth rails was sugar candy. The story for the next quarter century was not so happy, with the company's fortunes tagging along behind the railroads until, after disastrous depression years, the firm was reorganized in 1936.

Tied to one basic consuming industry, C. F. & I. has had two others for stabilizing influences. The remaining one-third of the company's normal business not involving the railroads is split between a tidy sale of wire products to a wire conscious agricultural section of the country and bar and structural steel products. These, to a great extent, pass through fabricators into mine and mill structures. Naturally, whatever other construction business takes place in the sparsely settled territory is a boon, and the Bureau of Reclamation has been a good customer in post-depression years.

A complete breakdown of C. F. & I.'s annual capacity for finished steel looks like this:

	Gross Tons
Finished Hot Rolled Steel Products:	
Rails—60 lb. or less per yard.....	10,000
Rails—over 60 lb. per yard	300,000
Splice bars and tie plates	100,000
Structural shapes—heavy	20,000
Structural shapes—light	25,000
Universal plates (up to 12 in.)....	8,000
Hot rolled strip (up to 12 in.)....	5,000
Bars—other than concrete reinforcement	71,000
Bars—concrete reinforcement	50,000
Wire rods	62,500
Rolled blooms and billets for forging	12,000
Total	663,500

Other Finished Products:

Wire—plain	62,500
Wire—galvanized	30,000
Wire—barbed	14,000
Wire fencing	18,000
Nails and staples	33,000
Bale ties	3,500
Fence and sign posts	4,000
Pipe bands	6,500
Finished ground grader blades....	4,500
Bolts, nuts, spikes and rivets	36,000
Forgings—grinding balls	13,000
Steel castings	2,960
Iron castings—ingot molds	14,000
Iron castings—rolls	1,000
Iron castings—all other	6,600
Brass castings	450
Cast iron pipe—gas and water....	12,000

The foundry obviously is devoted to plant requirements, the cast iron pipe business having gone by the Boards entirely with the advent of low cost centrifugal plants elsewhere. Since the war emergency, the forge shop has been expanded considerably, although the newest and largest hammer is owned by DPC.

On first glance, the government-owned war baby at Geneva, across the mountains, does not appear to offer much threat marketwise to this child of peacetime industry and agriculture whose products more or less conform to the needs of commercial customers. The Geneva semi-continuous plate mill

is built to roll 700,000 tons up to 132 in. wide annually; the 24-in. structural mill will be able to turn out 200,000 tons a year. Because C. F. & I. has no part in the flatrolled market, the Geneva plate mill holds no threat. Moreover, even if the space in the Geneva plant which yawns for continuous strip production is eventually filled, the big market for this material is on the Pacific Coast rather than on the eastern slope of the Rockies. The market for light gage material in the Denver sales district probably amounts to not more than 20,000 tons a year, part of which is accounted for by Hardesty Division of Armco Drainage & Metals Products Inc., an American Rolling Mill Co. affiliate. The district plate market, though it will welcome a nearby source, appears to be scarcely as large.

Rail Market Good

The Geneva structural mill appears a more likely competitor for C. F. & I. even in its wartime attire, but if it changes its dress and puts a bow in its hair before the postwar party it could pull the heartstrings of some of Colorado's customers. The relatively small amount of "powder and paint" required to produce rails at Geneva cannot be overlooked. Purchasing by the railroads on a reciprocity basis, the amount of business which would accrue to Geneva with its tremendous traffic to the Coast, would provide a nice nest egg. Although C. F. & I. picks up business from all the Western lines, examination of rail tonnages placed in the past, as reported by THE IRON AGE, shows that Santa Fe is the big C. F. & I. customer, possibly providing a third of the mill's rail business.

Most, if not the entire Denver & Rio Grande and Colorado Southern business, although it amounts to only 12,000 or 15,000 tons a year, plus respectable proportions of the entire tonnages placed by the Missouri Pacific, Southern Pacific, Union Pacific, Great Northern, and Northern Pacific are rolled at the Pueblo mill. If Geneva should tap the business of these lines in the middle, it would be a serious competitive threat; if Kaiser should start to syphon from the Coast end, it might be tragic. However, it must be pointed out that the prospective status of the Kaiser plant is that of a private competitor, whereas the key to the entire Geneva riddle is the government's handling of its financial interest there.

The profit accruing on rail manufacture at \$40 per gross ton—or even \$45 per gross ton as C. F. & I. now is allowed by the OPA—may not be



FIG. 3—View of Geneva's bank of open-hearth furnaces, looking south.

sufficiently handsome to warrant the new mills' seriously wooing this trade by modifying their facilities. Although the rail business may be the bread and butter of C. F. & I., it is certainly neither the company's cake nor frosting.

This brings this analysis to the matter of pricing policies which Geneva's new owners may adopt, or the government may force, even before the end of the war. Denver now boasts a steel fabricating industry far larger than normal for a city of its size, partly because it is the only industrial center of note in a wide area, and partly because it is the recognized fabricating and machinery center for mining and petroleum activities throughout the Rocky Mountains and western great plains. A market map of a leading Denver manufacturer and engineering contractor shows a thick cluster of projects in Colorado, Wyoming, western Utah, the Black Hills of South Dakota, fanning out to scattered jobs in Nevada, Arizona, New Mexico, northern Texas, western Oklahoma, Kansas, Montana and Idaho.

Although C. F. & I. occasionally has shipped to the foundry trade on the Pacific Coast, that area never has been and never will be a normal market outlet for steel produced in Colorado, and only under unique circumstances for finished products. On some products the rail freight rate from Pueblo to the Coast just shades being twice that of the intercoastal water rate, a comparison broad enough to make absorption out of the question. This situation, incidentally,

exists on a less serious scale for Geneva. Even Dr. J. R. Mahoney, director of the Bureau of Economic and Business Research of the University of Utah School of Business—one of Geneva's most rabid boosters—acknowledges "It would be quite unrealistic to consider the prospects of the Geneva plant in meeting competition in the Pacific Coast markets on the basis of existing class rates."

The freight rate matter, incidentally, provides an interesting example of how insidious government competition could be if the going got tough and politics dirty. This spring, Defense Plant Corp., which not only owns Geneva, but retains title to the steel the mill makes until delivery, pursued a campaign to lower freight rates to the Coast on finished steel. The medium of its attack was section 22 of the Tariff Act which permits railroads to allow rates lower than the established commercial tariff to agents of the federal government, political subdivisions or eleemosynary institutions. The regular rate for garden variety businessmen is \$12 per ton from Geneva to San Francisco, \$17 per ton from C. F. & I., and \$22 a ton from Chicago. The DPC thought that its shipments from Geneva warranted the rate of approximately \$7, and the traffic bureau of the Department of Industrial Development of the State of Utah asked that the rate be set at \$5.31. Certain railroads, apparently seeing the handwriting on the wall, volunteered to take the "government" traffic at \$8. Businessmen in other parts of the country, who face the possibility of competing with

DPC plants, should remember that DPC is a subsidiary of the Reconstruction Finance Corp., which still has a heavy hand in policies of many railroads.

Granting a favorable rate from Geneva eastward, possibility exists of a considerably broader sales territory for the Denver fabricators. Fabricators located between Eastern mills and Western destinations long have taken advantage of fabrication-in-transit provisions whereby, for a small additional fee, theoretical rail rates from mill to the consumer of the fabricated product are obtained. Because it is not possible to ship through Denver on a direct line from Pueblo to potential customers to the eastward, the Denver fabricators never have been able to take advantage of f.i.t. provisions on this basis, although some C. F. & I. tonnage has found its way by f.i.t. into the Kansas City district. Too avid a pursuit of such eastbound f.i.t. business, however, might provoke serious reprisal from Omaha fabricators, with cooperation of Midwestern mills, into Denver's own backyard. Thus, practical competitive situations alter the pursuit of pure theory. "Live and let live," to date, has been the law of the West, and the entire Geneva situation may even work itself out in this manner.

Pricing Practices Influenced

Even if Geneva does not seriously solicit business in Colorado, it can still alter the pricing customs there. Currently, steel is sold in Denver on a Chicago basing point. This allows Chicago and Eastern mills to go after

business there to an extent which would be impossible if it were necessary for them to absorb a big portion of the freight between Chicago and Denver. Even Bethlehem, shipping to Chicago from its Lackawanna mill by lake vessel, thence by rail to Denver, does a tidy business in the Rockies at times. The Denver price on bread-and-butter steel items is developed by adding a \$2.10 per 100 lb. Chicago base price to 91c. freight, giving a delivered price of \$3.01. C. F. & I. enjoys this same delivered price although the freight from Pueblo to Denver is only 20c., providing a nice cushion.

Now that Geneva is rolling plates a basing point has been established at nearby Provo, Utah, for that commodity, with a base price of \$2.60. It appears quite possible that Provo also will become a basing point for structurals. As long as the basing point price at Provo remains \$2.60, the present competitive situation in the Denver district will remain much the same. But if in the postwar period, Geneva should bring its Provo base price down to a figure comparable to Eastern basing point prices, the Eastern mills would be virtually shut out of the Denver market and C. F. & I. would lose the favorable status which it now holds.

Two factors will determine whether such a cut in the Provo base price ever takes place. If the mill which purchases Geneva has Eastern connections which ship a wide range of products to Denver, it may not be entirely advantageous to upset the practice. Too, if it is considered that the present high Provo base price on plates was approved by the OPA partly because Geneva's costs require it, a lower postwar price would not be possible.

Agitation by certain industrial groups on the West Coast for home ownership and operation of Geneva has been loud and vigorous. Where any Far Western group could secure the necessary capital to purchase the plant is not clear, but Uncle Sam appears to be the most likely soft touch. Such a plan would, of course, allow pricing of Geneva's products to be divorced from tie-in with Eastern mills which might be a considerable influence if an Eastern steel company acquired the plant. However, Western ownership would not solve the basic problem of costs. Like anyone else, unless the plant could be acquired for a fraction of its cost, the Westerners would have a hard time undercutting steel shipped to the Coast via the canal by mills bent on raising their operating rates. Running through the entire

Geneva saga are hints, such as this, that for all its modern equipment and for all the boasts of its supporters, the mill is not a low cost producer.

For instance, the experience of Columbia Steel Co. in operating its own Ironton No. 1 blast furnace at Provo, eight miles from Geneva, was drawn upon heavily in designing the Geneva stacks. When the present Columbia organization acquired this furnace from its predecessor company ore was charged as mined. The output of the furnace was between 275 and 350 tons of pig per day with a coke consumption of 2600 to 2800 lb. per ton of iron. By beneficiating the ore, sintering part of it, and careful charging, the capacity by 1936 was rated at 600 tons per day with a coke consumption of 1700 to 1800 lb. per ton. About the same time Geneva was built, WPB decided more pig iron capacity was needed at the Ironton plant, which has no steelmaking facilities, and DPC was commissioned to move an ancient blast furnace from Joliet, Ill., re-erect and re-build it at Ironton. This furnace was to have a rated capacity of 800 tons per day. Despite all the experience with the Ironton No. 1 furnace, the newcomer never produced satisfactorily after it was blown in, and after a few months operation was blown out, probably for good, despite the tight pig iron situation on the Coast.

One of the chief difficulties in operating the Utah furnace has been the local coking coal. Coal used to produce coke for the original Ironton furnace contained approximately 40 per cent volatile matter, and was particularly high in oxygen. Coked at a high temperature the resultant coke had a fingerlike structure and was small in size. The coke was satisfactory for the original small Ironton furnace (height 84 ft., hearth 15 ft. 9 in., bosh 19.6 in.). The larger Ironton furnace brought from Joliet (hearth 20.9 in) gave hint of the trouble that was to come at the new Geneva furnaces.

The tremendous size of the Geneva development required a coal mine expansion program involving the opening up of completely new beds. If the percentage of volatile matter was considered high on the coal coked at Ironton, on the coal from the new beds it can only be rated as stratospheric. At first, the net yield of coke per ton of coal charged ran about 38 per cent. At last word, this had been boosted to about 50 per cent, but it is still obvious that the resultant coke tends to be small and friable. Geneva's operators are confident that better coal will be reached as the beds are

opened up, and that sufficiently good coke can be produced so that the furnaces can operate full blast when sufficient labor is recruited to man the mill. Be this as it may, the difficulty is a many headed operating carbuncle.

While the spotlight has been focused on the fair head of Geneva, C. F. & I. has not been asleep in the balcony. More comfortable financially than for many years, a large part of wartime income has been devoted to girding the plant for stiffer postwar competition.

Sunrise Mine, in southeastern Wyoming, which has sufficient ore to take care of all C. F. & I.'s requirements for years to come, has been the scene of a development program which may cost the company close to \$2 million. A new two compartment shaft is being sunk to the 800 ft. level to allow complete exploitation of the principal ore body. The steel headframe, 199 ft. tall, is claimed to be the highest in the United States. Skips of 8-ton capacity will carry the ore to the surface. Sizing and screening machinery is located in the headframe whence it will pass to three ore bins ready for loading directly to the cars for shipment to Pueblo. A substantial new boiler house in which are located hoist and power equipment is nearing completion.

Mining costs at Sunrise are probably as cheap as any underground mining operation in the United States, for about three-quarters of the ore is suited to block caving and the balance to sub-level caving.

At the Pueblo plant, an elaborate ore bedding system and sintering plant have been installed which increase blast furnace output by 15 per cent, reduce variations in pig iron analysis, cut melting time, and simplify operations. All these improvements have been installed by the company without financial aid from the government.

In addition, DPC is sponsoring construction of 74 new Koppers-Becker coke ovens which will have an annual capacity of 327,000 net tons of coke. Although sufficient coke for operation of the plant is obtained from the present ovens, these new ovens will serve as insurance against future contingencies. Coke yield, incidentally, is about 65 per cent.

Thus it may be in the West as it has been in the East; no plant long holds an advantage over its competitors from the standpoint of modern equipment. Either the competitor slowly but surely goes out of business, or he, himself, modernizes his plant. C. F. & I. shows no signs of seeking oblivion.

Forging Naval Shells

By the Pierce and Draw Method

IMPORTANT production advantages have resulted from the adaptation by H. K. Porter Co., Inc., of Pittsburgh, through its subsidiary, Porter-Blairsville Co., Blairsville, Pa., of the pierce and draw method of forging large caliber projectiles for the U. S. Navy

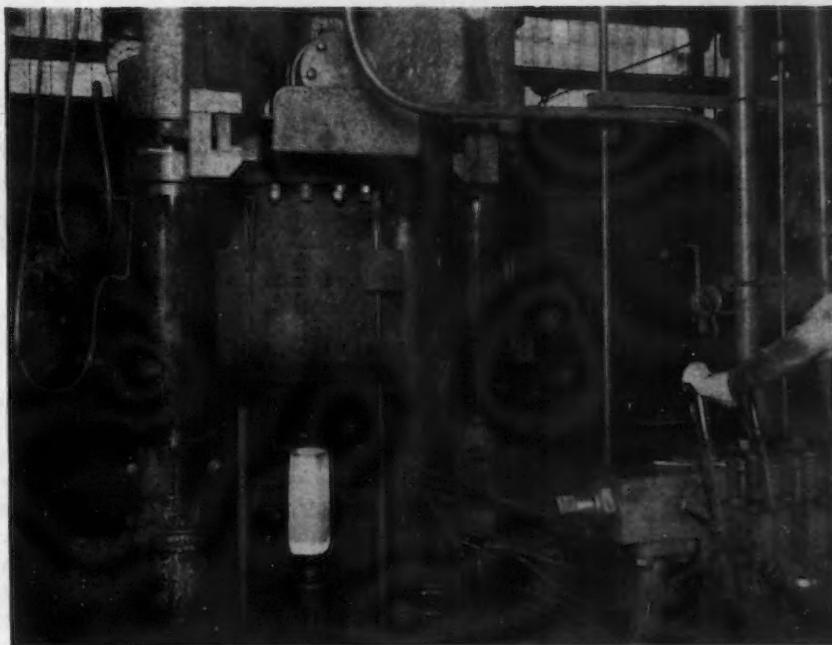
The general aspects of this method are reviewed here on the basis of information furnished by John C. Norman, general manager, Porter-Blairsville Co.

Previously straight cavity forgings had been used for projectiles of the caliber produced at Blairsville. The operation consisted first in upsetting and piercing in one pass in the press, using a straight punch; and second, drawing in the draw bench using five rings. The forging was then machined to give the proper contour for the nosing operation.

In the new forging method a shaped punch is used to produce a "contoured cavity," flaring out in size from the closed to the open end of the forging. Otherwise the operation is the same although a number of important factors may be noted.

Due to the fact that the contoured cavity is of larger diameter than formerly pierced, larger punches and mandrels are used, which give better rigidity and wear in operation. This tends to produce more concentric forgings and give better tool life. Also, because of the larger diameter mandrel used in the draw bench, there is less tendency for the base to punch through in drawing than with the smaller mandrel used for straight cavity forging.

Much less machining is required, since the required taper has been produced to a large extent in the forging process. In this feature alone, the contoured type forging has reduced the metal required per unit approximately 13 per cent, which constitutes a very valuable saving of critical shell steel. Closer concentricity of bore means that for nearly two-thirds of the length of the shell, the amount of metal to be turned from the outside diameter has been reduced by almost an inch. This reduction has in-



BY using a shaped punch to produce a contoured cavity, not only machining of the bore is lessened but also rough turning operations to bring the o.d. concentric with the bore are reduced. This view shows the billet piercing operation.



Slug in draw bench basket where it is drawn through five rings.

creased the capacity of the rough turning lathes 35 per cent. Due to the lighter cuts required, the life of

carbide cutting tools in this operation has been increased by an even greater percentage.

Corrosion Behavior Of Magnesium Alloys

... Inclusions of flux particles in magnesium alloy castings in the presence of an electrolyte establishes a continuous chemical reaction that is disastrously corrosive. Inclusions can be prevented by careful foundry procedure. They may also be detected and repaired prior to the installation of castings in service.

THE increasing demand for lighter and stronger aircraft materials in recent years has been particularly instrumental in establishing the commercial importance of magnesium base alloys. This is due to their high strength-weight ratio, coupled with the fact that production cost is surprisingly low.

Magnesium resembles aluminum in many respects but it is about two-thirds as heavy as aluminum and has a specific gravity of 1.74. Pure magnesium possesses relatively low strength, so its use is limited for commercial applications that require moderately high strength. Therefore, the pure metal is generally alloyed with small quantities of aluminum, manganese, zinc and silicon to improve the mechanical and physical characteristics of the resulting material. Aluminum is the principal alloying element to improve the mechanical properties of the alloy; zinc and manganese improve corrosion resistance; and the addition of both zinc and manganese tends to improve fluidity. Impurities such as iron, copper, and nickel have harmful effects on corrosion resistance and, therefore, should be kept at a minimum.

In addition to lightness, moderately high tensile properties, resistance to fatigue, and relative stability under normal atmosphere conditions, magnesium alloys possess excellent machining characteristics in comparison with aluminum, brass, bronze and

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o o o

steel. Magnesium alloys can be machined at high cutting speeds without the use of a lubricant, and since the metal is free from hard spots deep cuts can be made without sacrificing smooth finish. Machining costs may at times constitute so large a portion of the total cost of a finished product that a metal such as brass or cast iron can be advantageously replaced by a magnesium casting despite the higher cost of the metal before machining.

Magnesium alloys can be cast and forged, and rolled or extruded into sheets, rods, tubing and other shapes. They may be finished in various textures and colors, and can be welded. Magnesium alloy castings are used principally by the aircraft industry for engine parts, landing wheels, crankcases, gun mounts, oil pumps, intake manifolds and reciprocating parts in high speed machining used for textiles, packaging, printing and addressing.

Sand-cast magnesium alloys generally contain aluminum, manganese and zinc, whereas the die-cast alloys generally contain silicon which improves strength and facilitates production of uniformly good die castings. One of the most widely used magnesium alloys for sand castings, Dow-metal H, contains 5.3 to 6.7 per cent aluminum, 2.5 to 3.5 per cent zinc, 0.15 to 0.25 per cent manganese, 0.3 per cent or less of silicon, 0.05 per cent copper, and 0.01 per cent nickel, the latter two being impurities. The

microstructure of the as-cast alloy is shown in Fig. 1.

A glance at the microstructure of the alloy after solution heat treatment, Fig. 2, reveals the primary magnesium-aluminum phase to consist of massive, clear white, irregular crystals, somewhat resembling the matrix. The aluminum constituent occurs both in solid solution and as the intermetallic compound, designated as β (Mg-Al), which is sharply outlined in relief by the glycol etchant. When the latter phase is precipitated from solid solution, it forms a lamellar structure quite similar in appearance to the pearlitic constituent of the iron-carbon system in steel.

The magnesium-zinc phase usually occurs as Mg-Al-Zn and the microstructure is practically indistinguishable from the β (Mg-Al) phase. The microstructure of the ternary alloy essentially reveals the binary magnesium-aluminum complex.

Since the solubility of manganese at room temperature is less than 0.1 per cent, microscopically the element appears substantially as primary spheroidal crystals of bluish gray color. It is not affected by the glycol etchant, but circular pits are formed around the crystal when etching is carried on to some excess.

Silicon forms an intermetallic compound, magnesium silicide (Mg₂Si), by combining with magnesium. Sometimes mistaken for manganese, this constituent differs from the latter by its watery blue to iridescent blue green color. The solid solubility of the element in magnesium at the eutectic temperature is less than 0.003 per cent, but when the silicon content is fairly high (above 0.2 per cent) the phase usually develops into a structure resembling hieroglyphic characters, Fig. 3, readily distinguishable near the grain boundaries adjacent to the lamellar eutectic.

During the cooling process of the

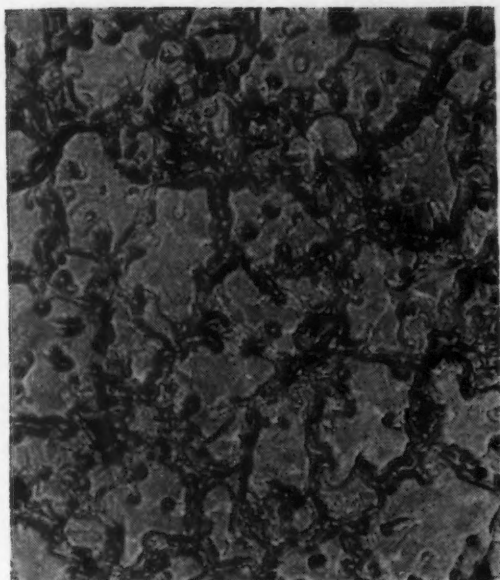


FIG. 1—Magnesium Dowmetal H, as-cast, at 100 diameters.

magnesium alloy, the α (Mg) phase becomes richer in aluminum as the latter dissolves in it and proceeds to crystallize. This causes the supersaturation of the grain boundaries with dissolved aluminum. When the aluminum tolerance (solubility) in grain boundaries contiguous with the eutectic constituent exceeds that permissible at lower temperatures, the supersaturation promptly gives rise to lamellar precipitation of the magnesium-aluminum phase as the temperature continues to fall. It is this lamellar composition which as a result of thermal treatment plays an important role in improving certain mechanical characteristics of the alloy. Furthermore, it is this structure to which we shall refer in the discussion of the corrosion phenomena of the alloy.

All common sand-cast magnesium alloys have a massive β (Mg-Al) microstructure. Crystals of permanent mold castings are smaller, and die castings have much finer crystal formation because of the rapid cooling of the melt which does not permit the precipitation of the β (Mg-Al) phase. Magnesium extrusions, forgings, and rolled products also have a fine microstructure.

Heat Treatment

With the exception of certain die-cast and wrought alloys, all magnesium alloys respond to solution heat treatment which improves tensile strength, ductility and resistance to impact. In this treatment castings are held at temperatures of 500 to 800 deg. F., depending on the composition of the alloy, for several hours to dis-

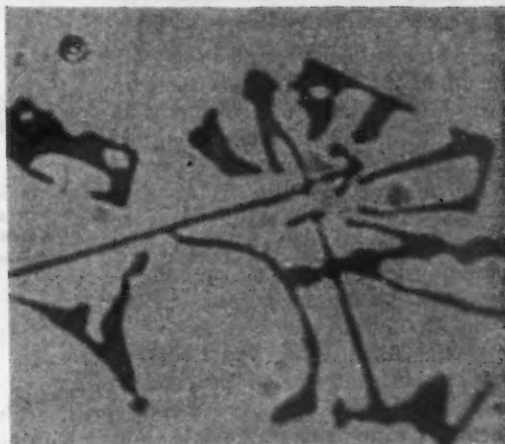
RIGHT

FIG. 2—Dowmetal H after solution heat treatment, at 500 diameters. Primary magnesium-aluminum is shown in massive, white, irregular crystals. (Mg-Al) is outlined in relief by the etchant. The lamellar structure similar to pearlite in steel represents this beta constituent after precipitation from solid solution.



RIGHT

FIG. 3—Magnesium silicide in Dowmetal H, at 750 diameters. This phase is also readily distinguishable in Fig. 2 near the grain boundaries adjacent to the lamellar eutectic.



solve the excess β (Mg-Al) into the α (Mg) phase. This is followed by cooling in air. This procedure affects the magnesium-aluminum-zinc constituent but magnesium silicide crystals and manganese particles remain unaffected.

The solution heat treatment is usually followed by precipitation hardening or aging at some temperature between 300 deg. and 450 deg. F. This treatment improves yield strength and hardness at a sacrifice of ductility or elongation. The extent of improvement of the former properties is determined by the aging temperature and time. The latter two, in turn, determine the form and the amount of precipitation of the eutectic phase which is formed. Moderately high temperature aging fosters lamellar precipitation from the grain boundaries, as shown in Fig. 4, whereas low temperature aging distributes a finer eutectic constituent throughout the intergranular areas.

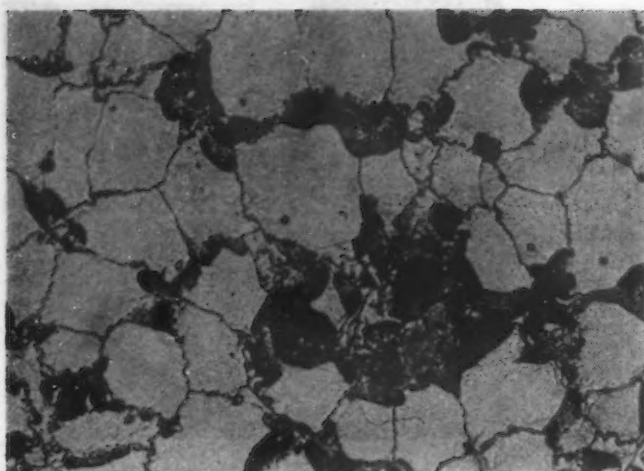
A stress relief treatment of magnesium alloys develops properties intermediate between those developed by solution heat treatment and by precipitation hardening. It may be applied with or without prior solution heat treatment. Fig. 5 shows

the microstructure of magnesium Dow H aged at a temperature of 450 deg. F. for 4 hr. followed by a rapid liquid quenching.

Die castings and wrought alloys of magnesium are not usually heat treated. This is precluded for die castings by the augmentation of individual micro-pores by elevated temperature, and for wrought alloys by the tendency to grain growth. However, in alloys containing a high percentage of aluminum (about 10 per cent), certain mechanical qualities are improved by a suitable aging treatment. Physical conditions are established comparable to solution heat treated sand castings provided that the β (Mg-Al) phase has been dissolved and rapidly cooled to prevent its reformation.

Atmospheric Corrosion

Magnesium alloys are highly stable and resistant to corrosion under ordinary atmospheric conditions. However, the surface of the metal gradually becomes dull by forming a semi-protective but not impervious film of magnesium hydroxide and magnesium carbonate. When this film is formed, further atmospheric attack is greatly retarded. Corrosion rate



LEFT

FIG. 4—Dowmetal H after solution treatment and aging, at 100 diameters. Contrast the finer lamellar constituent shown in the intergranular areas with the massive constituent β (Mg-Al) shown in Fig. 1. Solution treatment dissolves the excess of this eutectic phase into the α (Mg) phase.

may become more pronounced with elevations of humidity and temperature. This is particularly true of industrial atmospheres and along the seaboard. Salt air may cause precipitation of salt upon the metal which in the presence of moisture may result in pitting of the surface. To prevent this, surfaces of magnesium alloys are usually chemically treated with an aqueous solution of 1.5 lb. of sodium dichromate and 1.5 pt. of concentrated nitric acid per gal. of bath. The metal is primed subsequently with zinc chromate and painted with a synthetic resin enamel. For certain types of products, such as handles and steering wheels, the surface may even be rubberized.

In spite of the publicity received by magnesium alloys relative to their instability if unprotected in the presence of a salt water atmosphere, many of these alloys are actually in use under those conditions in a variety of indoor and outdoor applications. The fact that these alloys at times yield to atmospheric attack is attributable to their extreme sensitivity to the presence of impurities in microstructure. The character and the magnitude of attack are dependent on the nature and extent of impurity present. Therefore, an investigation into corrosion phenomena should consider the metal in its contaminated state since the effects of impurities often modify the behavior of the alloy. It is generally the presence of impurities that prevents the salt spray test from being fully representative of performance of magnesium alloys in service. Inasmuch as the representative behavior of the alloy is subordinate on the medium to which the alloy is exposed as well as on the operating conditions, tests should necessarily precede specific applications.

Magnesium alloys in general resist attack by solutions of alkalis,

RIGHT

FIG. 5—Dowmetal H after aging at 450 deg. F. for 4 hr. and quenching in liquid. This is a stress relief treatment to develop intermediate properties.

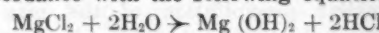


fluorides, chromates, manganates, and borates, the degree of resistance being directly dependent on the quantity of β (Mg-Al) complex present in their microstructures. As mentioned, solution thermal treatment brings about the solution of this phase into the alpha phase and precipitation heat treatment causes the formation of the Mg_2Al constituent. The alloys deteriorate rapidly in solutions containing the nitrates or sulphates of heavy metals, ammonium salts or calcium salts, and in many inorganic and organic acids. The use of any aqueous chloride solution in contact with these alloys should be avoided, as they are highly susceptible to corrosive action by chloride ions.

Corrosion may result from contact between a magnesium alloy and other metals in a chemical solution ordinarily considered to be non-corrosive. In assemblies comprising a magnesium alloy in contact with a dissimilar metal such as copper, tin, lead, nickel or steel, electrolytic corrosion may occur as a result of electrical potential setup between the unlike metals. Even wood, being porous and thus retentive of moisture, may have a corrosive influence on the metal by the galvanic action of the acids or salts contained in its interior. Consequently, adequate electrical insulation should be provided in assemblies of magnesium alloys with other metals or wood.

In melting magnesium a great amount of flux consisting mainly of magnesium chloride is employed to skim impurities off the surface of the melt just before pouring. But, small particles of the flux occasionally find their way into the cast product. Such inclusions are harmful to the mechanical properties of the alloys and render them highly susceptible to corrosion in the presence of moisture.

Magnesium chloride is hygroscopic and absorbs moisture from the atmosphere to form magnesium hydroxide and hydrochloric acid in accordance with the following equation:

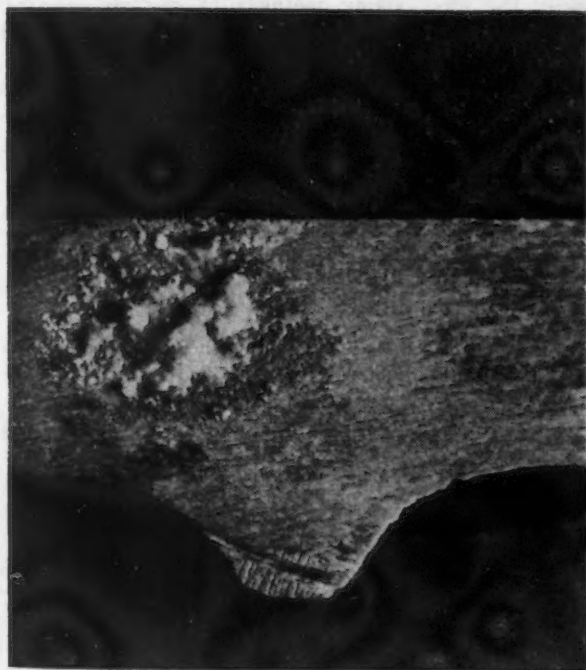


The resultant hydrochloric acid reacts with magnesium atoms to form additional magnesium chloride molecules. In contact with moist air, the latter decomposes into magnesium ions (Mg^{++}) and chloride ions ($2Cl^{-}$), forming additional magnesium hydroxide and hydrochloric acid molecules by reacting with moisture. This reaction proceeds until all chloride ions have been rendered ineffective either by exhaustion of the moisture or the corrosive chloride ions.

The process is analogous to the growth in the human body of cancerous tissue at the expense of normal tissue cells. The only remedy in relieving the patient of the disease is to remove by surgical operation the carcinous structure together with some of the surrounding tissue. An analogous panacea in the case of the magnesium alloys is to grind out the entire corroded area together with some of the surrounding sound material. The cavity may be subsequently filled by Heliarc welding if desired. However, extreme care should be employed in welding in order to obtain a sound and acceptable structure.

An explanation of the mechanism of this type of corrosion in magnesium alloys, commonly called blooming, may be gained by inferring that as magnesium chloride (flux inclusion) decomposes and gives rise to the formation of hydrochloric acid, the latter forms an electrolytic medium between the magnesium base and its constituents. Furthermore, since the intercrystalline precipitation has lower eutectic point, it is more readily amenable to the action of the electrolyte and therefore the chemical reaction starts with this constituent and rapidly spreads along the crystal boundaries, attacking at the same time some of the alpha solution structure of the alloy.

Then the question arises as to when the chemical reaction stops. Theoretically the reaction does not cease until the negatively charged component (chloride ions) has been completely eliminated. An expression giving the amount of corrosion product M produced in time t is shown in



Study of Flaw

Recently a magnesium Dow H specimen containing a defect (blooming) similar to that given in the foregoing was brought to the author's laboratory for investigation. The specimen was an aircraft cowling bracket having in its web section a soft spot which appeared externally as if filled up with liquid cement. On sectioning the part into two pieces along the plane of the defect, the defective structure was brought into plain view. One of the pieces was used for micrographic investigation and the other was reserved for chemical analysis.

Before chemical analysis, the section was exposed to the laboratory atmos-

phere for seven hours. The result, shown in Fig. 6, was the formation of a deliquescent mass of white substance, gradually increasing in area, on the surface of the section. This mass, spectrographed, was found to conform to the following quantitative analysis:

	Per Cent
Magnesium	10.0 (min.)
Aluminum	1.0 (min.)
Manganese	1.0
Zinc	1.0
Chlorides	24.0 (min.)
Silicon	0.01 to 0.1
Lead	0.01
Iron	0.001 to 0.01
Copper	0.001 to 0.01
Impurities Sn, Ca, B, etc...	traces

The other half of the specimen was mounted in Lucite, polished, etched, and immediately photomicrographed. The microstructure of the defective area, Fig. 7, shows dark areas at the crystal boundaries attacked by the hydrochloric acid evolved from the magnesium chloride (flux) inclusion. It will be noted that the attack first occurs at the lamellar precipitate consisting of the aluminum-magnesium phase and proceeds to the primary solid solution constituent and β (Mg) phase.

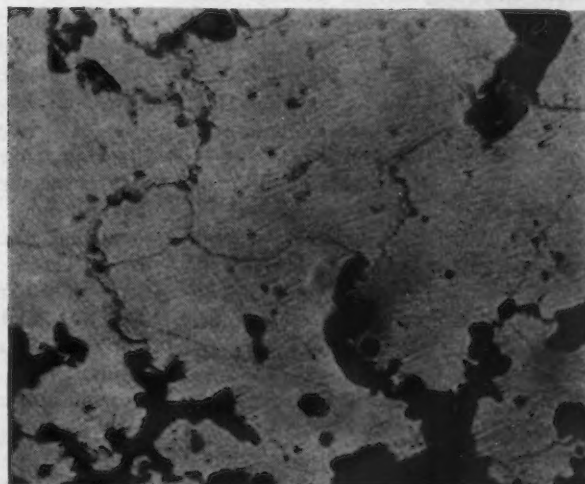
This specimen was left overnight on the microscope stage. The next morning the corrosion product had formed an amorphous crust on the surface of the specimen. The crust was washed with distilled water and the surface polished lightly and etched. A second micrograph was made, shown in Fig. 8. Note the extent of progress of the corrosion areas and the complete disappearance of the intercrystalline eutectic and of the matrix. Corrosion is also most active at the microshrinkage fissures. For further investigation the specimen was left in the open air for a period of four months with intermittent microscopic examination of the defective area. At the end of this period, corrosion had formed a continuous

LEFT

FIG. 6—Sectioned specimen of Dowmetal H showing a deliquescent mass of white corrosion product identified as essentially magnesium chloride.

RIGHT

FIG. 7—Blooming of Dowmetal H, at 100 diameters. Dark areas at the crystal boundaries, indicate attack by HCl evolved from flux inclusion. Attack begins in lamellar precipitate, proceeding to primary solid solution and α (Mg.) phase.



the author's tentative computation which follows:

$$\log \frac{M_0}{M} = C \left[\frac{i^2}{2.303 (1-i)} \right] t$$

in which M_0 is the initial quantity of the reactant metal, i is the ionization product of the electrolytic ion, and C is a quantity dependent on the amount of moisture, the magnitude of the temperature influencing the corrosion reaction, and on the number of isolated corrosion spots. In such a reaction, impurities included in the matrix serve as cathodic centers and the solid solution phase as the anode.

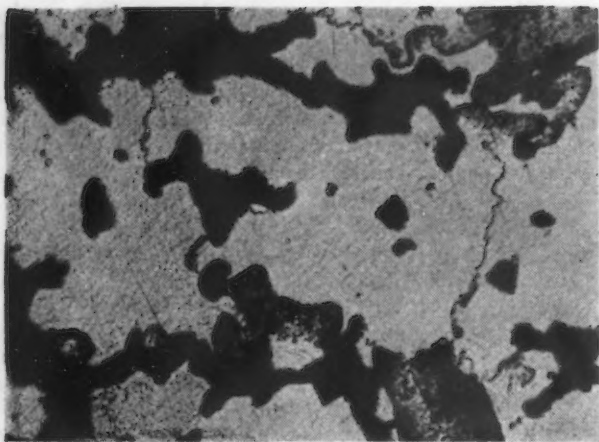


FIG. 8—Progress of corrosion at 100 diameters, after overnight laboratory exposure.

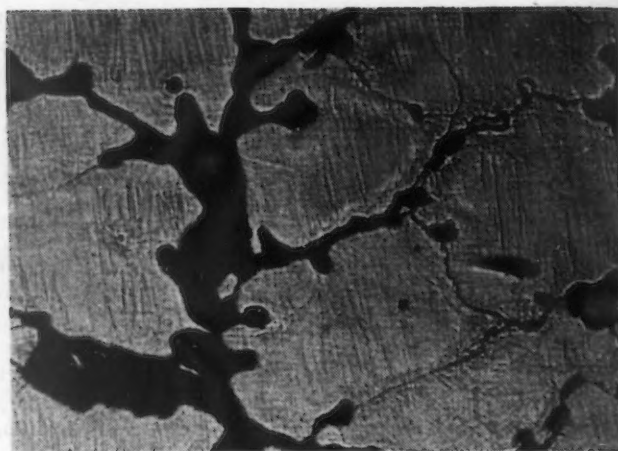


FIG. 9—Burning due to high temperature heat treatment of Dowmetal H. Compare burned areas with effects of corrosion shown in Fig. 7 at 100 diameters.

cavity from one surface of the specimen to the other, a linear distance of about 8 mm.

Detection of Blooming

Parts having this defect (blooming) can usually be detected after having been pickled in the dichromate solution and dried. That portion of the part containing an inclusion, which is usually on or near the surface, invariably remains wet and at times slightly sticky. To test the flaw for magnesium chloride flux in-

clusion a small quantity of the defective material is removed from the casting and tested with a 1 per cent solution of silver nitrate. If the clear silver nitrate solution turns milky, or if a white precipitate forms, it is positive evidence of the presence of magnesium chloride. The test is so sensitive that minute traces of the impurity afford a positive indication. Therefore, identification of the defect is possible at all times.

From the foregoing it should be appreciated that the failure of magne-

sium alloys in service need not be attributed solely to the failure of surface treatment such as pickling, priming, and painting. Failure can also be due to poor foundry technique and to variables such as fluxing, skimming, and molding. Therefore, the magnesium founder is constantly devising methods of melting, mixing, and purifying the alloys in an attempt to produce sounder and stronger magnesium coatings for war materials and civilian goods. The future of magnesium alloys is promising.

Permeable Refractories for Gas Fired Furnaces

THE discovery of a new principle in furnace design is a rare occurrence. A furnace heated by the combustion of gases has always been held to comprise a combustion chamber, a chamber in which the goods are heated, and a flue through which the products of combustion are removed from the furnace; some or all of these functions may be performed by the same chamber, but in general these functions are clearly defined. The last occasion when a new technique was introduced was in the period 1906 to 1910 when Prof. W. A. Bone and C. D. McCourt developed the technique of surface combustion.

A new principle has just been described by R. H. Anderson, D. C. Gunn and Dr. A. L. Roberts involving the use of permeable refractories through which furnace gases are withdrawn from the furnace chamber. This has been worked out by the Department of Coal Gas and Fuel Industries at Leeds University, the Yorkshire Industrial Gas Development Centers, the Bradford Gas department, and certain manufacturers

including a prominent British manufacturer of insulating firebricks. The new furnace can be applied to many types of heating operation and several units have been in operation for considerable periods. It has been developed primarily with town gas as the fuel, but it can be used on other fuel gases provided they are free from dust.

Among the characteristics of the newer insulating refractories that are now employed in hot face insulation is that of high permeability to gas flow. This has been regarded hitherto as a difficulty overcome by backing the insulating refractory with a normal refractory of low permeability. The authors, however, conceived the idea that the gases could be withdrawn from the furnace chamber through the pores of the refractory, if it was made sufficiently permeable, and that considerable benefits would result. Initial trials suggested that a permeability at room temperature of 4 to 5 cu. ft. per hr. per sq. in. of material 1 in. thick would be satisfactory. Owing to the increase in the vis-

cosity of gases with temperature these figures would be reduced to 1 to 1.5 at 2192 deg. F. Data obtained in industrial installations showed, as was to be expected, that the permeability of the structure as a whole was some three times greater than that of the material.

The method of construction is that the furnace chamber is built of permeable refractories, that is, of open-textured insulating firebricks, behind which is a space, which in turn is backed by a normal firebrick wall. If the pressure on the furnace side of the wall is sufficiently greater than on the side farther from the furnace, the products of combustion will pass through the wall; consequently, there is no flue leading from the furnace chamber in the ordinary way. The difficulty of keeping sufficient positive pressure within the furnace chamber when the door is opened periodically, has led to a suction being maintained in the annulus into which the products are withdrawn.

It appeared likely that this design
(CONTINUED ON PAGE 154)

Industrial Precision Castings

By a Manufacturing Jeweler

By J. ALBIN

WHEN J. R. Wood & Sons, Inc., New York, one of the oldest and largest manufacturers of jewelry rings, entered industrial precision casting and formed the J. R. Wood Products Corp. to handle this part of the business, the company drew on its fund of skills to attack the bottlenecks in an ambitious program for the mass production of ordnance and aircraft instrument components.

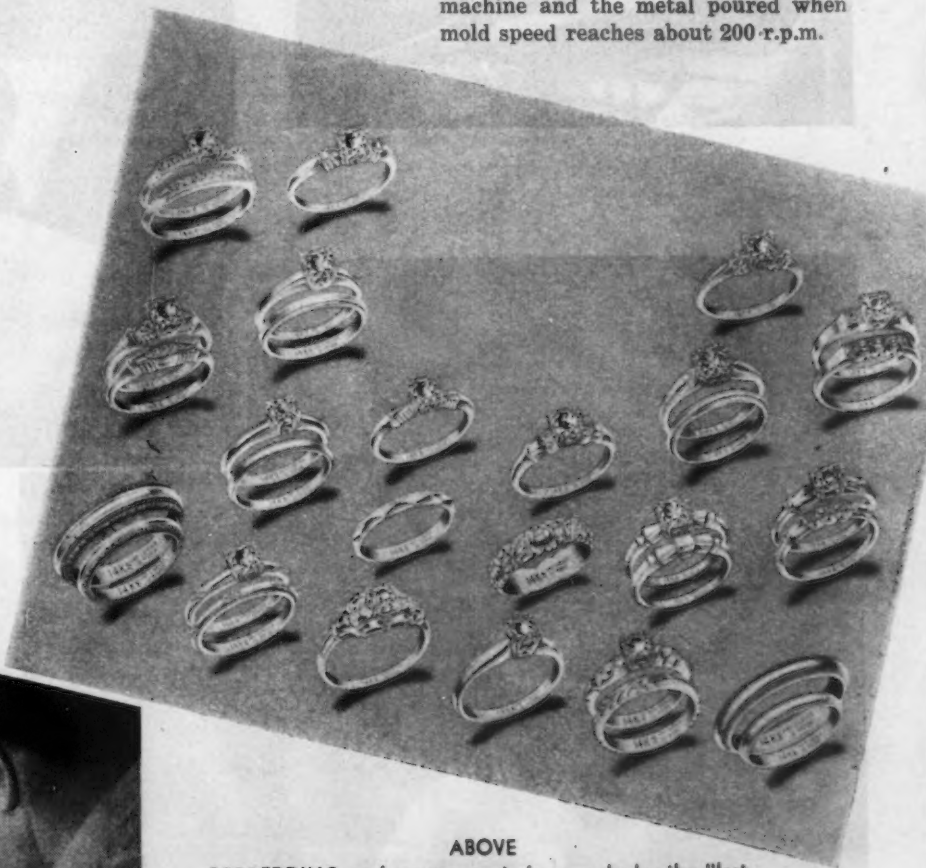
The Wood company carries out its precision casting by the conventional "lost wax" process, first by constructing a steel mold of the part to be reproduced. Into this mold melted wax is injected under air pressure and when the wax has solidified and removed from the mold it is then an exact replica of the cavity in the mold. The wax model corresponds to the pattern in ordinary foundry practice and when handled properly will be the means for providing a casting that is of good surface, solid mass, sharp outline and dimensional accuracy.

The wax model (or models) is then placed in a steel flask into which is poured a mixture of water and a refractory material composed of plas-

ter of paris and high silica sand. This is the so-called "investment," which when solidified encases the model intimately without compression or distortion.

The next characteristic step consists of the elimination of the wax by

placing the flask in a cold oven and heating gradually to 1300 deg. F. or over. At this temperature all the wax will have evaporated and only the cavity originally occupied by the wax remains in the investment. The red hot molds are then placed in a company-designed centrifugal casting machine and the metal poured when mold speed reaches about 200 r.p.m.



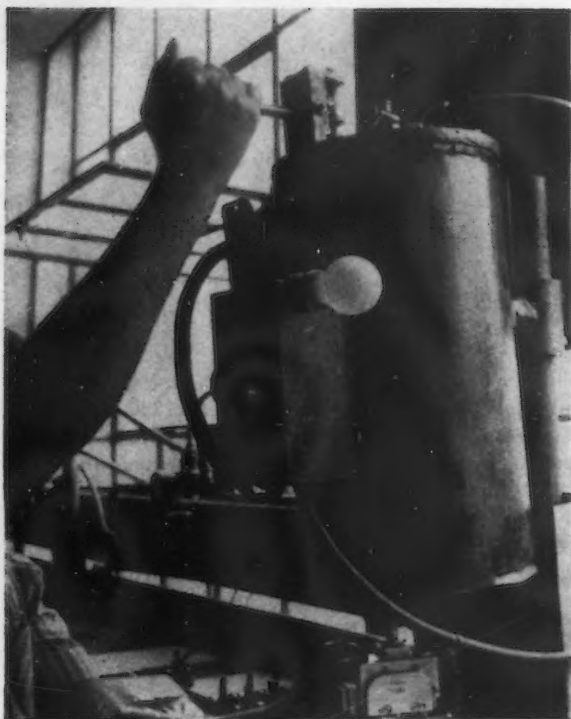
ABOVE

WEDDING and engagement rings made by the "lost wax" precision castings technique at the plant of J. R. Wood & Sons, one of the largest makers of wedding rings in the world. Much of the "know how" obtained on this class of work has been transferred to the manufacture of war instrument parts, except that the master molds for the latter are made of steel instead of rubber, used in ring making. Note the fine details obtained by casting process.

LEFT

CONSTRUCTION of steel molds for making wax models requires ever-fresh ingenuity and much patience on the part of the tool maker, since he must keep in mind the manual removal of the wax model. The steel mold was substituted for the more easily made rubber mold when the J. R. Wood Product Corp. found that the latter lacked the accuracy required for the fabrication of precision instrument components. A steel mold is good for as many as 60,000 wax models before signs of wear are apparent.





LEFT

INJECTING hot wax into the steel mold, lower right. This wax is a blend of six different waxes and has low shrinkage on solidification. The operator holds the mold under the orifice of this pressure wax injector, while operating the valve lever. The temperature is regulated by the dial switch in front. In the left background may be seen faintly the air pressure regulator; a pressure of about 60 lb. is generally applied to the wax, which is sufficient to have the wax reach all the corners of the impression and to provide a continuous non-porous wax surface. This wax injector is largely the development of the Wood Corporation.



ABOVE

WITH the use of a small tool the wax model is carefully pried from the steel mold, an operation which may appear rather simple to an observer when the model is being correctly removed. Timing the opening of the mold is critical. The proper pliability of the wax necessary for successful removal depends on how much the wax has cooled. After the wax model has been taken out, the mold is lightly brushed with castor oil, shown at top, before injecting new wax. The blade at the lower part of the picture is used to separate the mold. The operator removes all wax slivers before closing the mold.

o o o

LEFT

THE wax model is being carefully inspected for cavities or other irregularities and these are then filled in with wax. For this operation, an array of characteristic jewelers' tools are used, which may be seen at the lower right. The wax models of circular parts shown above the hand are thin enough to be almost transparent.





A SECTION of the wax model injection and inspection production line of the J. R. Wood Products Corp. The models receive final inspection before being placed on trays. The trays will next be brought to a covered truck and conveyed to another part of the plant where the investments are made. A battery of wax injection machines may be seen along the bench.

o o o



ABOVE

SPRUNG or gating, wherein the operator mounts several wax models on a central wax cylinder or gate. The three models, which in this instance comprise a single casting group, are placed at the angles shown to obtain the optimum metal distribution in centrifugal casting. Note the use made of the towel in this picture and in previous steps to lessen the possibilities of wax particles getting attached to the model. In the same connection, the sheet metal upright cuts down dust that might be carried by a draft.

BELOW

THE wax models are now being mounted on the sprue holder. This is a rubber disk having an annular ring into which the flask is fitted. After the flask is placed over the sprue holder, Plasticine is placed along the bottom edge to prevent leakage of the poured investment. At the right center are the flasks ready for receiving investments. After the investment is poured over the models, the flask is placed under a vacuum and at the same time the table is oscillated in order to release air absorbed in the investment.





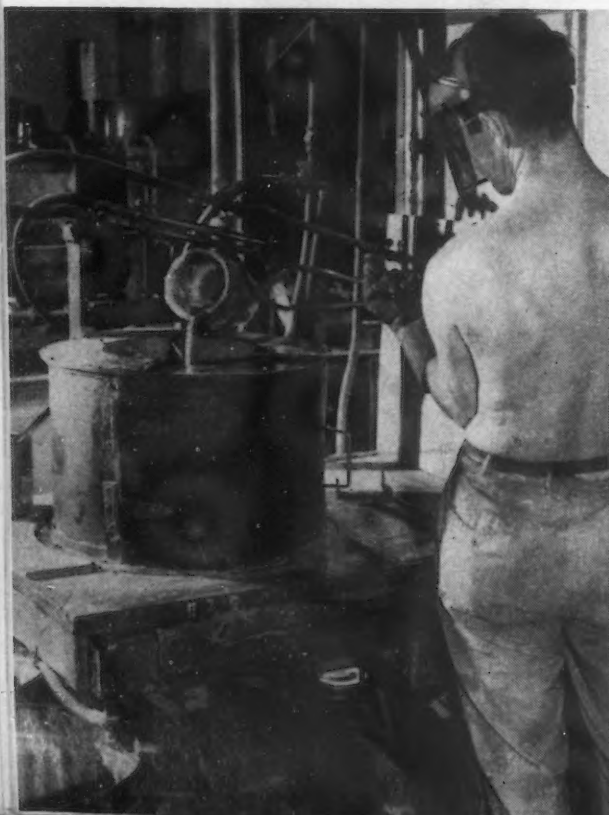
ABOVE

SECTION of a battery of pyrometer-controlled furnaces used to evaporate the wax without residue, leaving a complex cavity of precise dimensions. At the same time the flasks are heated to the proper temperature for casting. This may range up to 1500 deg. F., depending upon the alloy being cast. The investment filled flasks are being placed by the operator in the oven at room temperature. The flasks in oven No. 4 are being heated while those in the oven to its left will soon be placed in the casting machine. The company intends to replace the battery of muffle type ovens when a single automatic conveyor type oven will be made available. With such a furnace a considerable amount of the wax can be melted out and saved during the first heating period.

o o o

BELOW

POURING the metal into the centrifugal casting machine. In this machine, designed by J. R. Wood Products Corp., six flasks are attached to arms which are set revolving by means of a motor. Before the metal is poured into the central crucible or riser, the latter has been heated by the blow torch which can be seen above the crucible. The flasks are permitted to revolve for a few minutes at the casting speed (200 r.p.m.) in order to cool.



RIGHT

THE casting is now ready for cutting apart. Any investment that has been left after the previous step can be removed with the use of a moderately stiff brush. The individual castings are separated from the gates by means of a band saw and the cuts are made smooth by a grinding wheel.

o o o

BELOW

MOLTEN metal being poured into the Carborundum crucible from a Detroit electric arc furnace. The pyrometer above controls the melting temperature. Preparatory to pouring, the operator at the left has completed a check of the melt by stirring with the probe shown. The Wood Corporation has been working chiefly with aluminum, bronze, and also sterling silver which is used in certain radio apparatus.



RIGHT

FINISHED castings are now subjected to final inspection. The illuminated magnifier is used for the smaller components. No further surface finishing is done to the pieces after they come from the casting machine.

o o o



BELOW

A GROUP of assorted parts used in direction finders, small motors and radar equipment after final inspection. One dimension of the largest pieces at the right is 3 in. Dimensional accuracy within ± 0.002 in. can be maintained. The J. R. Wood Products Corp. completes about 10,000 of these pieces weekly.



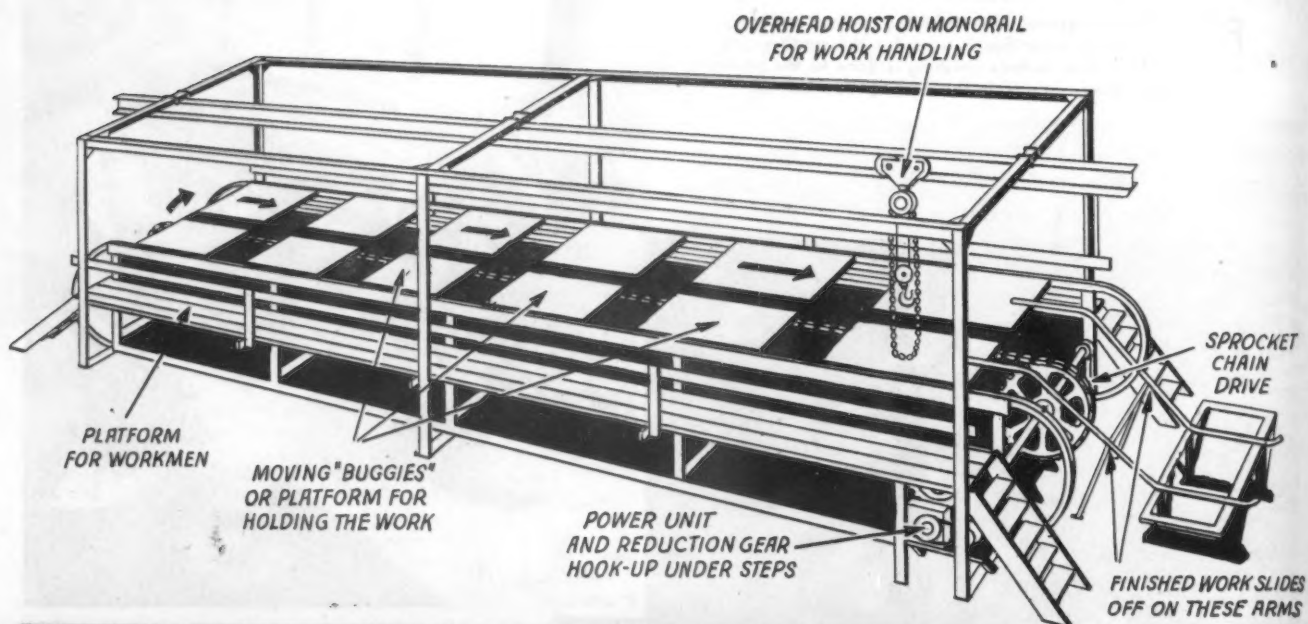
ABOVE

INVESTMENT and castings are now being removed from the flask, which is a heat-resistant alloy. A wooden mallet is used to separate the flask from its contents. Most of the investment is removed by striking lightly with the mallet and dipping into the water tank shown. No attempt is made to save any of the investment.

o o o



Conveyor Boosts Welding Output by 7



ABOVE

FIG. 1 — Diagrammatic sketch showing general construction details of conveyor structure.

o o o

LEFT

FIG. 2 — Tack welding cross member to side of the outer tower for lift truck.



RIGHT

FIG. 3—Front of conveyor structure showing first of the finish welding operations. Outer tower in foreground is next unit to be welded.

o o o



70 Per Cent

... With this welding conveyor system built along simple lines eight welders are able to meet the high production rate of 145 lift truck tower assemblies per week, aided only by two helpers in place of the eight helpers previously required.

AN ingenious, power driven, welding conveyor system which has increased the output of tower units for industrial lift trucks by approximately 70 per cent is reported by The Lincoln Electric Co., Cleveland, whose arc welding equipment is extensively used in this unique production line arrangement. The current weekly production rate of 145 complete tower units has been made possible with this conveyor.

The conveyor line was designed and built by the Paterson-Leitch Co., structural steel fabricators of Cleveland. A diagrammatic view of the conveyor as it appears from above is shown in Fig. 1. The conveyor, about 60 ft. in length, moves the work along at a rate of about 2 ft. per min. and is powered by a 1 hp. motor with a speed reduction gearing arrangement transmitting the drive to large shop made gears. Fig. 2.

Prior to the building and installation of this conveyor the job of welding the outer tower assembly required eight welding operators and eight helpers with either eight individual small cranes or one large overhead crane for handling the work. With the present conveyor setup, only two helpers per eight operators are needed and with one overhead crane for work handling. Only six operators and two

helpers are required for welding the less complicated inner tower structure, thus effecting a proportionate manpower saving in welding this part of the subassembly. For this latter operation, the conveyor speed is increased by changing drive to a different gear ratio.

Fabrication of the tower units starts with the cutting of various members to size by sawing or by a flame cutting machine. The next step involves assembly of the pieces in a jig where the work is held in position with the help of C-clamps while the operator tack welds the members at the joints. This phase of the production is shown in Fig. 2 where the operator is tacking a cross member to the side of the outer tower. Here, the horizontal and vertical tack welds are made using 5/32 and 7/16-in. electrodes for mild steel.

The outer tower, which measures 8 ft. 1½ in. in length by 4 feet 4 3/16 in. in width and weighs approximately 900 lb. is then moved by overhead crane to the conveyor line where it is finished welded. Each welder in the line has specific welding operations to

complete on certain parts of the structure. The individual operators have become accustomed to the work so that a high degree of efficiency and speed is maintained. In Fig. 3 the first of the finish welding operations are being made; ¼-in. electrodes are used throughout to further speed the procedure. Another view of welding



ABOVE

FIG. 5—Close-up of outer tower construction.

o o o

LEFT

FIG. 4—Specific weld operations for each operator, such as shown here, feature the conveyor line operations.

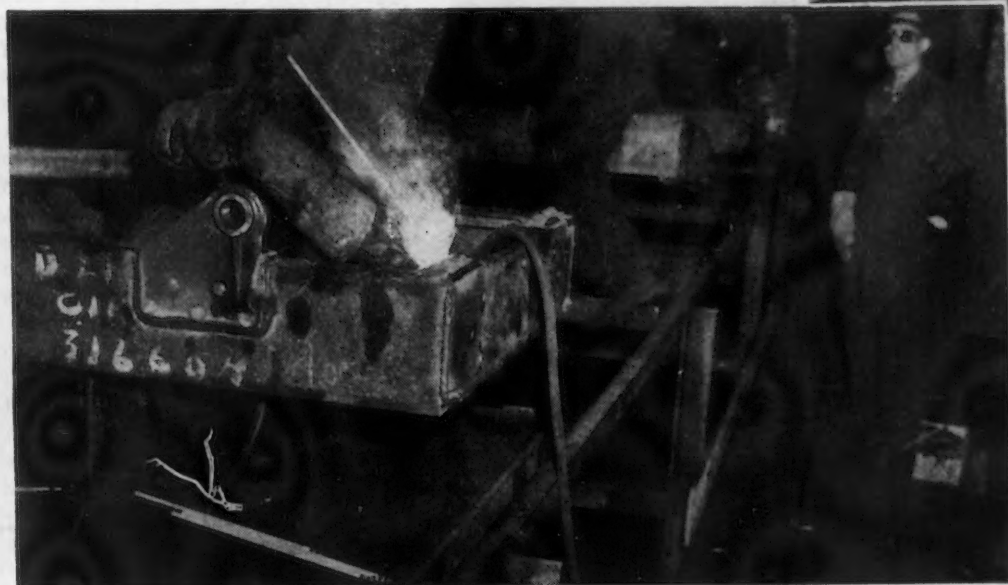




FIG. 6—Close-up of inner tower construction. This unit fits inside outer tower.

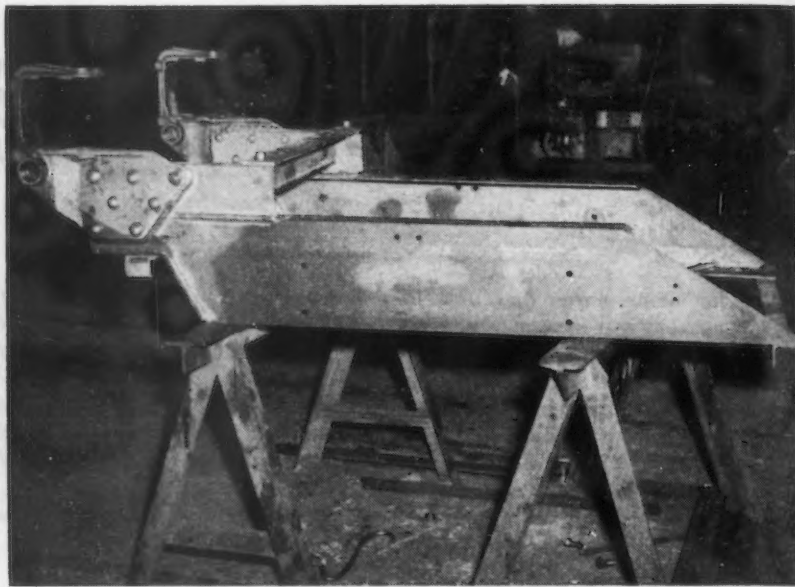


FIG. 7—View showing details of welded base frame assembly.

operations further along the conveyor line is shown in Fig. 4.

One of the many interesting phases in the design of this tower unit is the method used in fusing guides for the rollers. These guides consist of 2½-in. strips of ⅝-in. plate welded inside the angle members which form the side pieces of the tower. The rollers contact these guides, or tracks, and thus prevent wear on the angle members. In order to present a smooth surface for the rollers, eight holes are drilled through each strip so that they can

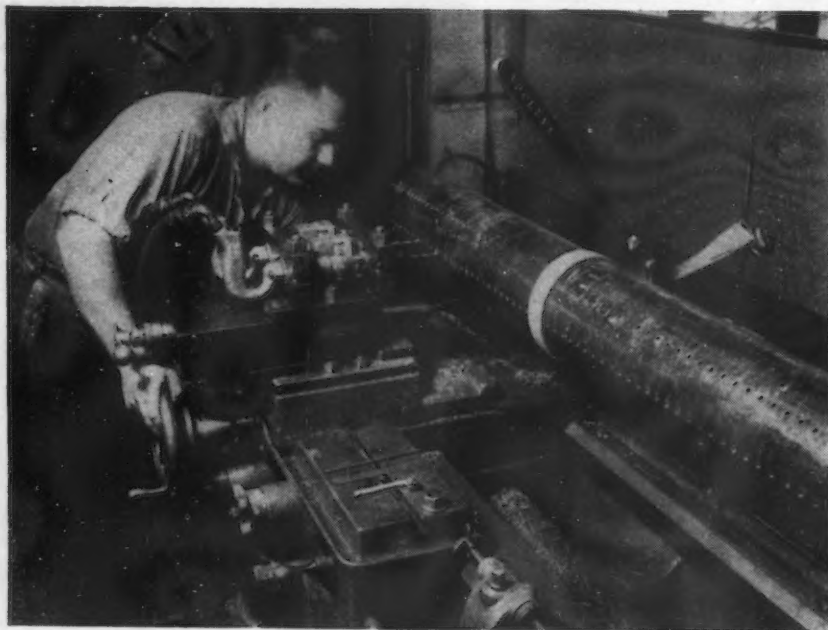
be plug welded directly to the inner surface of the angle without presenting any obstruction for the rollers. This same procedure is carried out in the construction of the inner tower where 11 holes are used for plug welding the roller guide.

The same general fabricating methods are used in the production of the inner towers, which weigh approximately 700 lb. The work is first tack welded, then moved to the conveyor line for finish welding. Construction details of the two assemblies are illus-

trated in Figs. 5 and 6. Close tolerances must be maintained throughout as the inner tower must fit inside the outer tower with proper clearance for freedom in sliding up or down.

The base frame assembly (Fig. 7) for the lift truck towers is considerably smaller, measuring about 7½ ft. by 3 ft. 1 in. and requires less welding than the two tower structures. This unit weighs about 500 lb. and is made up principally of 11 by 4¼-in. channels and cast members.

Holder Simplifies Multiple Drilling on Engine Lathe



AN engine lathe set up to drill holes in 6-in. drain pipes for surface condensers so that it is necessary to lay out only the first hole in each row has been devised by J. Behan at the South Philadelphia, Pa., plant of the Westinghouse Electric & Mfg. Co. The pipes are 18 ft. 6 in. long and require the drilling of 200 holes. A special holder designed to hold two air drilling machines so spaced as to maintain the proper pitch is provided. The holder is bolted in place in the compound tool holder slot. Then the cross feed is engaged and the holes drilled through.

With this setup it is necessary to lay out only the first hole in each row, as a micrometer stop attached to the ways, used in conjunction with block, plug and pin gages, provides accurate spacing. To move from one row to another it is only necessary to turn the faceplate by hand and align drill to layout.

Heat Resisting Resins Have Wide Applications

THE first commercial production of Silicones is underway by the Dow Corning Corp., Midland, Mich., thus making available to industry a class of fluids, greases and resins having unique stability against heat and chemical attack. They contain silicon, the chemical element to which the good qualities of ordinary glass are chiefly due.

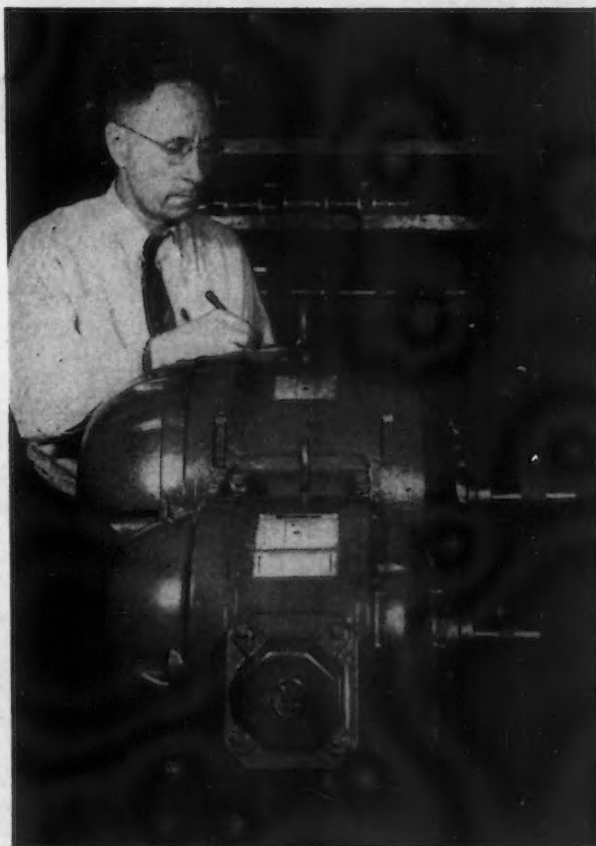
Silicones are polymers in which organic groups comprising carbon and hydrogen are attached to a silicon-oxygen chain framework. From this structure Silicones derive the heat resistance and some other properties of silicates together with some of the more desirable properties of organic or carbon compounds.

Silicone fluids are water white liquids that have a number of uses including compass liquids and hydraulic fluids that act as damping fluids to prevent the vibration of indicators or pointers on instruments. They have been found useful also for surface treatment of ceramics to reduce surface conductivity. Minute amounts are very effective in reducing the foaming tendencies of certain lubricants and they have been found useful for pump packing impregnants for use in pumps handling hot liquids.

Two series of Dow Corning fluids are available depending on the temperature and viscosity range to be covered. Dow Corning Type 200 fluids are useful down to -40 deg. F. or up to 392 deg. F. and include medium through very high viscosity liquid Silicones. They are non-volatile and possess flash points in excess of 600 deg. F. They are not miscible with alcohol glycol, glycerin or lubricating oil but will blend readily with most of the common organic solvents, including light naphthas.

For extremely low temperature uses, Dow Corning Type 500 fluids include liquids ranging in viscosity from that of water to medium viscosity fluids. They are all useful at temperatures down to -94 deg. F. and below. The very low viscosity fluids are distillable and have appreciable vapor pressures at room tem-

THOUGH the motor in the rear is twice as large as the one in front, both produce 10 hp. at 1750 r.p.m. Higher operating temperature makes this possible. The larger motor is made with Class A insulation and operates at 105 deg. C., total hot spot temperature, while the smaller motor is made with high temperature silicone insulating materials. Both motors were constructed by Westinghouse.



perature but higher viscosity fluids in this series are non-volatile and useful up to 392 deg. F.

Plug Cock Grease

Dow Corning plug cock grease is a silicone product whose physical properties make it particularly useful in plug cocks and lubricated valves which must operate at elevated temperatures or be subjected to corrosive chemicals.

This grease has the consistency of vaseline at normal temperatures. It remains a soft grease and will not harden or melt over a temperature range from -40 deg. to more than 400 deg. F. It is highly resistant to attack by acids, alkalies and oxidizing agents. It minimizes the corrosion of metal plug cocks by keeping the corrosive liquid from contacting the metal surface, thereby promoting the continued free operation of the valve. It has no corrosive action on metals and does not swell or deteriorate rubber, synthetic rubber or plastics.

Plug cocks can be packed with Dow Corning plug cock grease after the old grease has been cleaned out completely. Where service conditions do not permit the removal of valves which have become frozen due to hardening of conventional greases, Dow Corning plug cock grease can often be used to free the plug by forcing it in with the lubricant screw.

Dow Corning 31 grease is for use in bearings that must function at very low temperatures and Dow Corning 41 is for use at temperatures up to 500 deg. F.

Resinous Dielectric

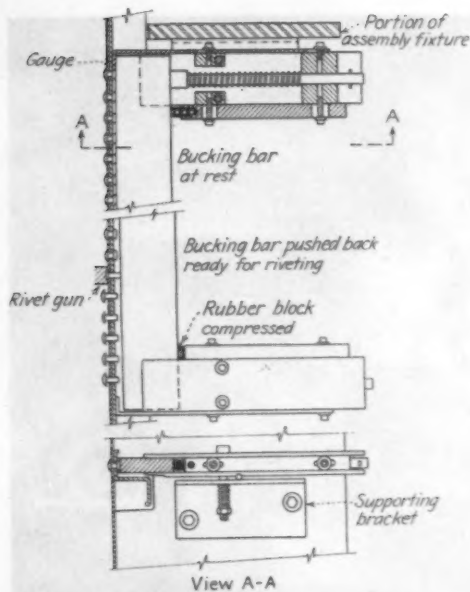
Silicone insulation provides a resinous dielectric for electrical insulation which will raise safe operating temperatures of many types of equipment from the previous range of 105 to 120 deg. C. (221 to 248 deg. F.) to a new range of 150 to 200 deg. C. (302 to 392 deg. F.). Silicone insulation, it is claimed, has the further merit that sparks or short circuits cause no carbon deposit—hence, do not result in tracking.

Dow Corning silicone resin 993 is a heat curing, high temperature stable silicone varnish recommended for (1) impregnating motor stators, transformer coils and other non-rotating coils, (2) varnishing Corning Fiberglas or asbestos served magnet wire, and (3) varnishing Fiberglas, mica and asbestos electrical insulating cloths, tapes, sheets and sleeving.

When Dow Corning 993 is coated on panels and is air dried, it forms a sticky film which becomes tack-free after 1 to 3 hr. of baking at 482 deg. F. When used on Fiberglas served magnet wire or on other heat resistant electrical insulating materials, the

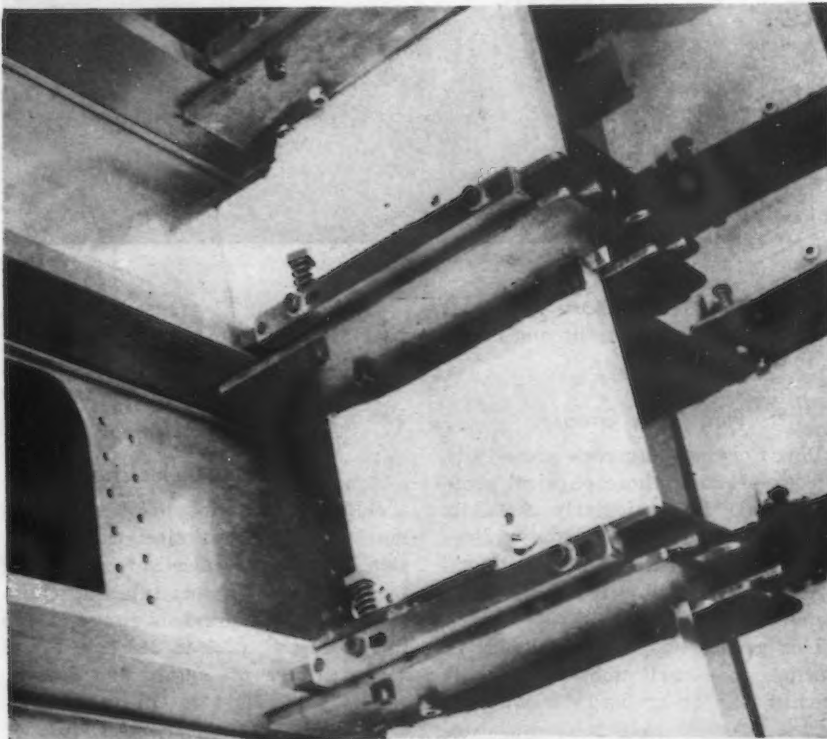
[CONTINUED ON PAGE 160]

Bar Bucking Assemblies Speed Riveting



LEFT

FIG. 1—The rivet bucking assembly set up in a fixture. The bar responding to the impulses of the spring loaded reacting hammers upsets one rivet at a time, the size of the head dependent on the gage shown at top.



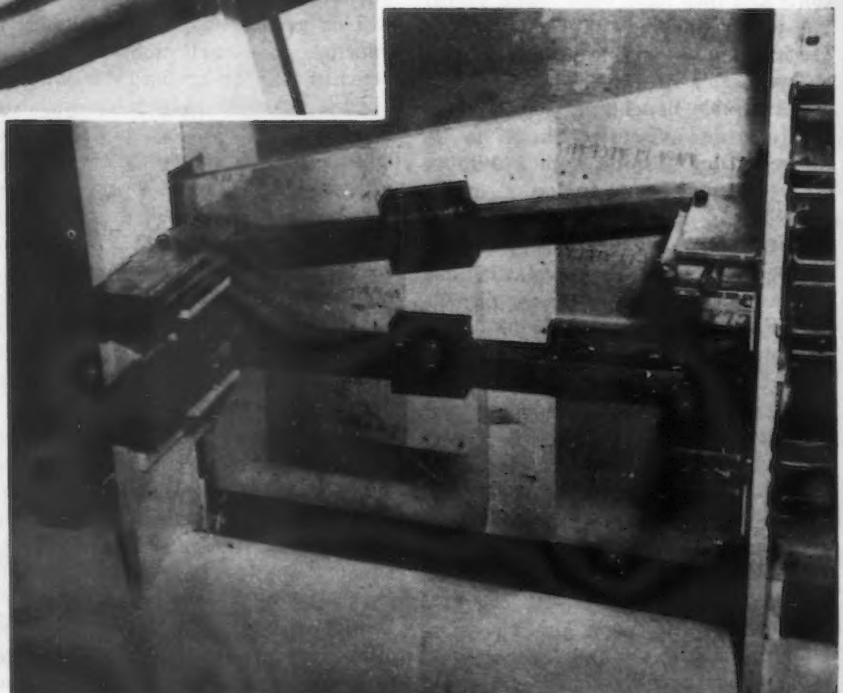
ABOVE

FIG. 2—In the jig version, the rivet bucking assembly is supported at each end of the sides of the fixture or intermediate members by means of a device which serves to guide the bar and support the reacting hammer and rubber dampers.

o o o

RIGHT

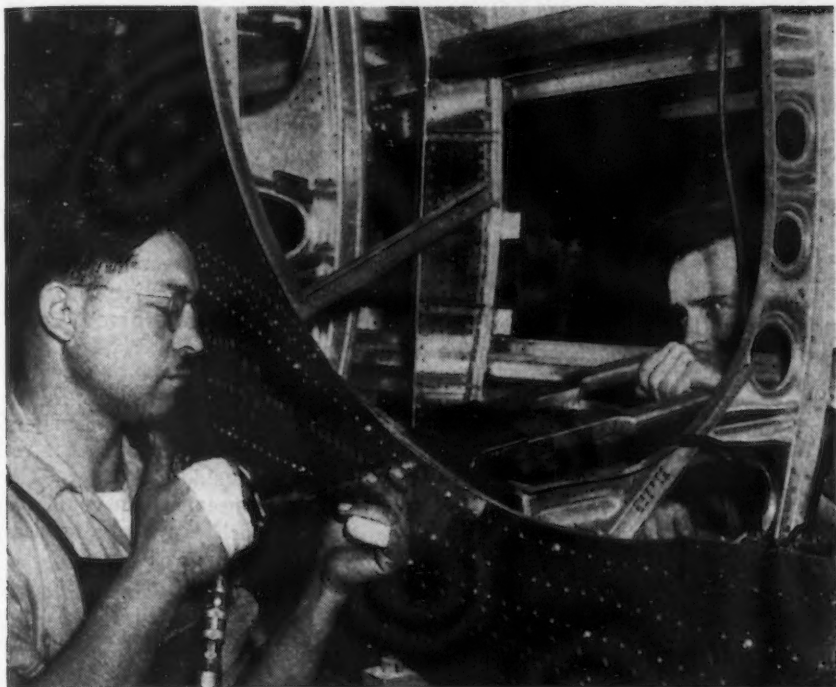
FIG. 3—The rivet bucking assembly can be constructed in a variety of sizes and shapes to accommodate the configurations of any line of rivets. Provisions have been made on these bars to accommodate rivets that are adjacent to the main line of rivets.



A RIVET bucking assembly which may be welded manually by a rivet bucker or may be set up in a jig or fixture frame so as to function automatically, stems from an invention of Morris Brown, 54-year old tool maker at Consolidated Vultee Aircraft Corp., San Diego, Cal., where the use of this type rivet bucking assembly has resulted in materials saving, improved workmanship and increased output.

The device consists essentially of a "floating" bar, which can be positioned against the shank end of a rivet, and two or more spring actuated hammers which react against the back side of the bar in opposition to impulses from a conventional air rivet gun. Adjacent to each of the reacting hammers is a special rubber stop or snubber which helps hold the bar constantly in position against the upset end of the rivet by damping any tendency to vibrate (Fig. 1).

The assembly may be constructed in a variety of sizes and shapes, to fit the particular riveting job. When set up in a jig or fixture, the floating portion of the assembly in the shape of



ABOVE

FIG. 4—The manual adaptation of rivet bucking assembly is especially useful in tight spots, such as the one shown above, where the workman cannot put a lot of muscle behind bucking bar. Reacting hammers do all the heavy work.

an elongated steel bar extends behind a row of rivets, and is supported to the sides of the fixture on intermediate member by means of a device which serves to guide the bar and support the reacting hammer and rubber dampers. The device is pivoted to the framework of the jig, so that the bar is flexibly held (Fig. 2). The straight or horizontal bar may give place to one that is curved or offset to accommodate the configuration of the line of rivets. Provisions, moreover, may be made on the bar to accommodate rivets of different sizes, or a group of rivets that are adjacent to the main line of rivets (Fig. 3). A gage on each supporting device controls the size of the upset head, promoting uniformity and preventing over riveting.

Manual Assembly

The manual bucking assembly consists of a bar shaped to suit the particular job and a suitable light-weight handle in which the reacting hammers and rubber stops are incorporated (Fig. 4). For long rows of rivets, the bar may have a thin rectangular face which will enable the operator to cover several rivets simultaneously, thus eliminating the likelihood of sup-

porting one rivet while the gun operator drives another. For work in tight spots, where only one rivet at a time can be supported, the bucking bar on the manual assembly has a small circular face. No marked muscular effort is required; the workman needs only to support the handle in the proper position, allowing the reacting hammers to absorb the impact of the blows of the rivet gun. By means of an adjustable bolt extending from the bucking bar through the handle, it is possible to have the reacting hammers absorb any part of the energy expended by the rivet gun.

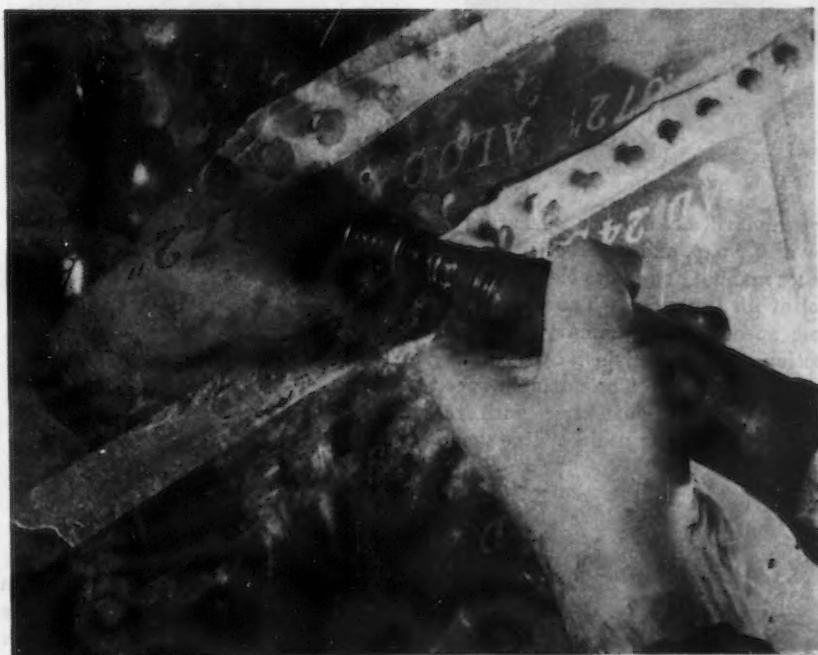
The operator stops hammering when he notes a decided change in the sound of his blows.

When the jig rivet bucking assembly is used, the rivets are inserted in the proper holes and held in place by a strip of scotch tape, Fig. 5. The gun operator can accomplish the entire job by himself, working from one side of the jig. The jig riveting assembly is particularly valuable in countersunk riveting, a job which previously required the services of a skilled riveting team. It facilitates the preservation of smooth aerodynamic contours by eliminating the

o o o

BELOW

FIG. 5—Interesting use made of scotch tape to hold a row of rivets in place prior to jig riveting.



possibility of skin deformation, and simplifies the work so that an unskilled worker can drive a perfect row of countersunk rivets. Time studies to date have revealed that the Convair riveting assembly effects a 25 to 50 per cent saving in time on those jobs where its usage is practicable.

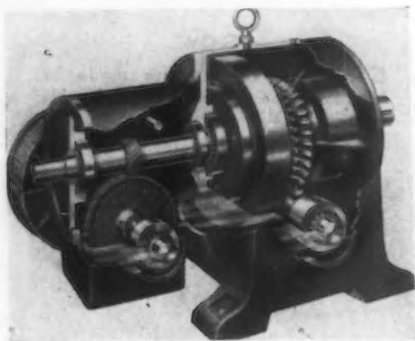
The time saving factor will be realized after the proper procedure for setting up the bars on the jig or fixture frame has been established by the riveter. This will require a few trials before the best set-up is achieved for the particular riveting job.

New Equipment . . .

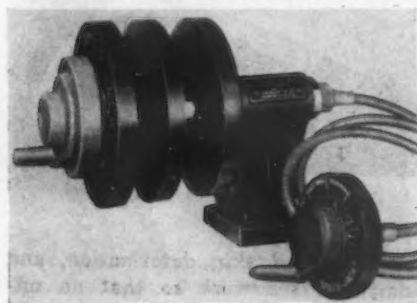
Power Transmission

. . . Recent developments in mechanical drives, electric motors and controllers and related power transmission equipment are described in the following pages.

A LOMBARD variable speed reducer drive which covers a range of 3 to 100 hp. has been announced by *Lombard Governor Corp.*, Ashland, Mass. The units are driven



by standard a.c. motors, operating as low as 0 r.p.m. and reverse with either direct manual or remote electrical control of all functions. The V-belt controls speed only. Primary speed reduction is accomplished by ordinary gearing methods. The variable speed output shaft is concentric with the motor shaft giving a direct line drive.

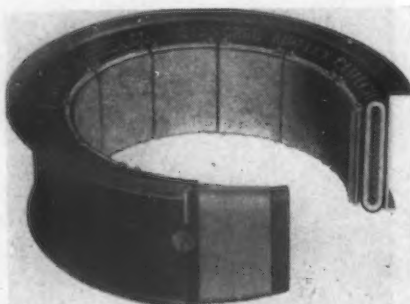


Speed Jack

A VARIABLE speed transmission has been developed by *American Pulley Co.*, 4200 Wissahickon Avenue, Philadelphia 29, for drives up to 1 hp. Remote control is simplified through a compact flexible shaft which makes it possible to mount the unit anywhere in or on the machine and to place the control in a convenient location. The unit uses V-belts to provide stepless control of speed through a 3 to 1 ratio.

Compressed Air Clutch

A CLUTCH operated by compressed air has been announced by *Fawick Airflex Co.*, Cleveland. A tire-like rubber gland expands as compressed air is introduced into it and thus effects a union between the driving and driven members of any industrial machine. Since there are no moving parts in the clutch, lubrication and adjustment becomes unnecessary. The clutch is adaptable to both heavy and light loads. The flexibility of the tire-like gland is said to insure uniform pressure over the entire clutch face and to automatically correct for misalignment of driving shaft with the driven shaft.



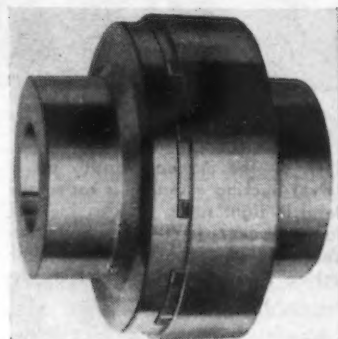
Flexible Coupling

DESIGNED to compensate for angular and parallel misalignment, a shock absorbing flexible coupling has been announced by *Automatic Machine and Tool Co.*, 132 Charles Street, Auburndale, Mass. The Multi-flex coupling is cushioned in water and oil-resistant rubber. The rubber center member is made up of two driving specially constructed metal parts molded into the rubber and spaced to evenly distribute the load through the flexible center.

Flexible Coupling

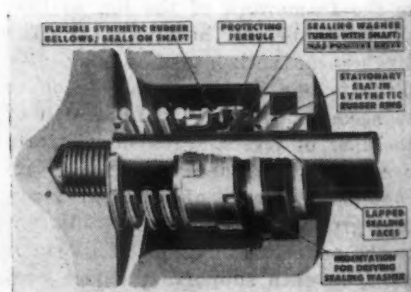
A NEW and improved Lovejoy type C coupling has been announced by *Lovejoy Flexible Coupling Co.*, 5009 West Lake Street, Chicago 44. An outside steel collar holds the load cushions in place. An extension of this collar which encircles the cou-

pling safeguards material and fingers from the heads of the bolts that secure the load cushion retainer. The boltheads are concealed. The couplings are designed for heavy duty services from 4.60 to 806 hp. at 100 r.p.m.



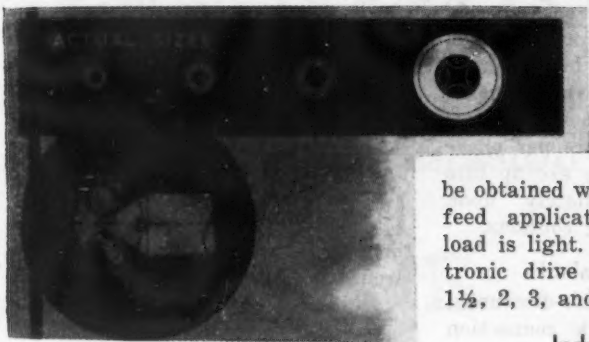
Shaft Seal

A BELLOWS type shaft seal designed to eliminate stuffing box leakage and provide sealing on centrifugal pumps, refrigeration compressors, speed reducers, rotary pumps, agitator shafts, etc., has been announced by *Crane Packing Co.*, 1878



Cuyler Avenue, Chicago 13. The John Crane seal consists of a flexible synthetic rubber bellow, the tail end of which grips and seals along the shaft, a stationary floating seat held in a synthetic rubber sealing ring and a positively driven sealing washer which turns with the shaft and is held against the stationary seat by spring pressure. A feature of the seal is the flexing head of the bellows which offers no resistance to the spring. This design allows the sealing washer to remain in contact with the seat as

the sealing faces wear and provides automatic compensation for shaft vibration and end-play.



Miniature Ball Bearings

MINIATURE pivot type ball bearings in sizes ranging from 2-10 mm. o.d., made of beryllium, stainless or chrome steel, have been announced by *Miniature Precision Bearings*, Keene, New Hampshire. The bearing races are machined from solid bar stock and high finished on raceway and exterior surfaces. Each bearing is equipped with four balls of the same material as the cup and fitted with a retaining cap.

Electronic Motor Control

AN electronic motor control for variable speed drive of d.c. motors in sizes of 10 to 500 hp., from 3 phase 60 cycle lines has been announced by *Electron Equipment Corp.*, 917 Meridian Avenue, South Pasadena, Cal. The electronic transformer, a development of the company, makes possible the control of large motors at speed ratios as high as 100 to 1. The motors can be operated at constant torque, constant horsepower or at combinations of these. They can be supplied with remote control, fast reversing, plugging and inching all from one lever on the machine if desired.

Electronic V-S Drive

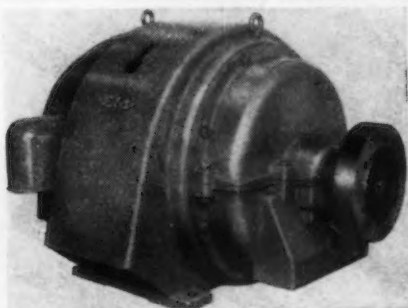
AN electronic system of adjustable speed (v-s) drive which is operated from the regular polyphase a.c.



distribution system, 220, 440 or 550 volt, 2 or 3 phase, 25, 50 or 60 cycle, to provide speed ranges of 20 to 1 or better is announced by the *Reliance Electric & Engineering Co.*, Cleveland. A substantially wider range of operating speeds can be obtained where, as in machine tool feed applications, the actual motor load is light. At the outset the electronic drive will be available in 1, 1½, 2, 3, and 5 hp. sizes.

Induction Motors

FOR all types of industrial, power plant, water-works and other drives, a line of heavy-duty induction motors has been announced by the



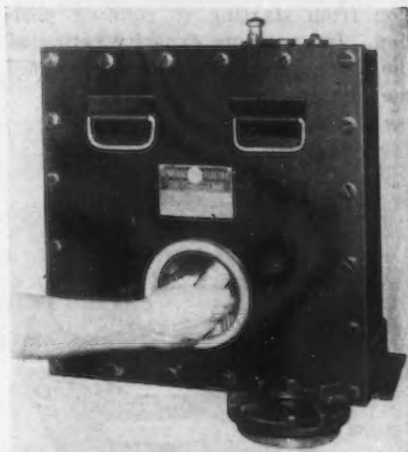
Electric Machinery Mfg. Co., Minneapolis 13. Motor sizes range from 200 to 1000 hp. and are available in squirrel cage and wound rotor models. Special electrical and mechanical modifications can be supplied to meet specific power service and motor application conditions. Form-wound stator coils have multi-layer insulation with high dielectric strength and moisture resistance. Directed, smooth-flow ventilation for cool motor operation is provided by rotor fan and conical baffling.



Revolving Field Generators

AS an addition to their line, *Kato Engineering Co.*, Mankato, Minn., are manufacturing Katolight revolving field generators. They are available as independent two bearing generators suitable for belt or coupling drive or as single bearing generators designed to fit standard SAE engine

bell housing. They are built in sizes 5, 10, 15 and 25 kw., 4 pole (1800 r.p.m.) and in sizes 5, 10 and 15 kw., 6 pole (1200 r.p.m.). Voltage regulation is approximately 10 per cent with 2 cycle speed change. The generators can be obtained in all standard voltages and frequencies.

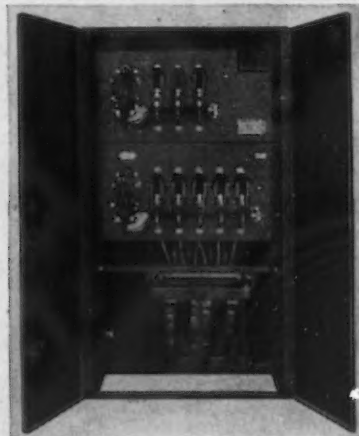


Explosion Proof Starter

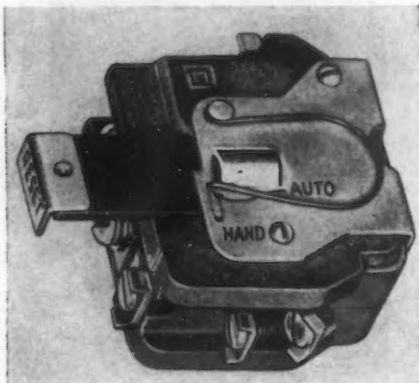
AN improved line of a.c. full-voltage explosion-proof starters for use in gaseous mines has been announced by *General Electric Co.* Available up to 50 hp. in the reversing type and up to 100 hp. in the non-reversing types, these starters are housed in heavy, explosion-proof enclosures fabricated of steel plate. The wide flanges between the cover and the body of these enclosures are ground to close tolerances to prevent the escape of burning gases. Access to the line fuses is facilitated by a hand-hole cover equipped with an inspector's seal.

Motor Starter

A MAGNETIC, reduced voltage, squirrel cage motor starter which protects motors from sustained overloads, locked rotor condition, single-phasing and overloading from too frequent starting has been an-



nounced by *Allis-Chalmers Mfg. Co.*, Milwaukee. Called type ARC, the starter is available for control of motors from 5 to 2500 hp. up to 5000 volt, 3 phase, 50 or 60 cycle. Reduced voltage, two-point starting is obtained with a built-in auto-transformer utilizing synchronous motor-driven, adjustable timing relay for transition from starting to running position. Interrupting capacity rating of the new starter is said to be ten times the motor's full load current.

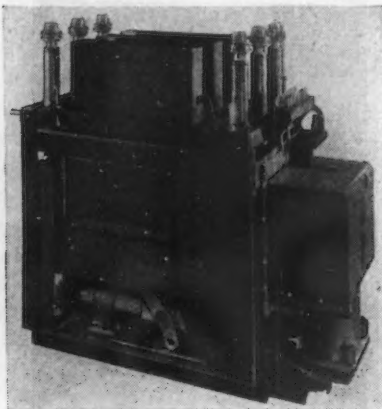


Overload Relay

A BIMETALLIC overload relay which provides an easy and positive method of changing from automatic to hand reset has been announced by the *Square D Co.*, Milwaukee. The tripping point can be adjusted from 85 to 115 per cent of nominal rating. Thus, changes can be made in settings to take care of variations in ambient temperature or load conditions at the motor. Overload protection is not limited to the usual selection of heater sizes since intermediate points can be obtained.

Circuit Breaker

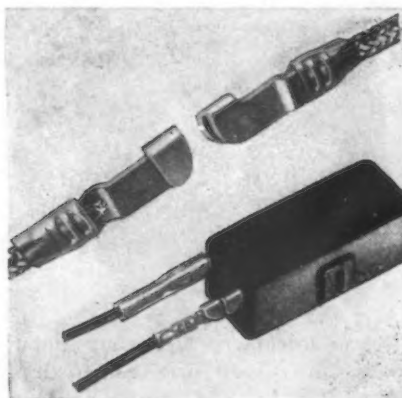
A MAGNETIC type air circuit breaker for oil elimination in indoor switchgear equipment has been announced by *Allis-Chalmers Mfg. Co.*, Milwaukee. The Ruptair breaker is available in high voltage, oil-less



switchgear rated up to 5000 volt and up to 150,000 kva interrupting capacity. The arch chute has been coordinated with the contact and arc runner design to give consistent and reliable interruption through the entire range of current to be interrupted. The magnetic circuit consisting of one husky blowout coil and two laminated iron pole pieces per phase is arranged to force the arc up into the arc chute immediately upon separation of the arcing contacts.

Disconnect Terminal

A SOLDERLESS knife-disconnect terminal for quick connection and disconnection has been announced by *Aircraft Marine Products, Inc.*, 1591L North Fourth Street, Harrisburg, Pa. Switches which have tabs extending from the contacts to which the external connections are soldered



may be converted to disconnection switches by replacing the contact members with members embodying a knife-disconnect end. Switches which have screws or binding posts for external connection may be converted by fastening a disconnect tab on these screws. A solderless connection can also be made by wrapping the conductor alternately around the tongue and under the hook.

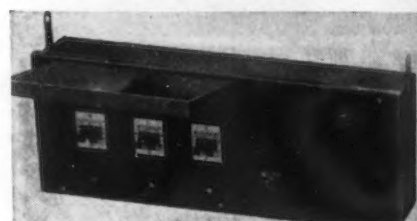
Magnet Wire

A RIBBON-RECTANGULAR magnet wire available in shapes as thin as 0.004 in. has been announced by *General Electric Co.* The final dielectric strength of the wire, judged by its reaction to abrasion and winding and the wire's resistance to abrasion, heat-shock and solvents is said to be greater than that of other en-

ameled wire. Because of its thinness, Formex ribbon-rectangular wire can be applied where round wire previously had to be used. The wire is also said to increase the winding space factor and may be used in place of larger-size rectangular magnet wire to increase magnetic effect or reduce coil size.

Circuit Breaker Box

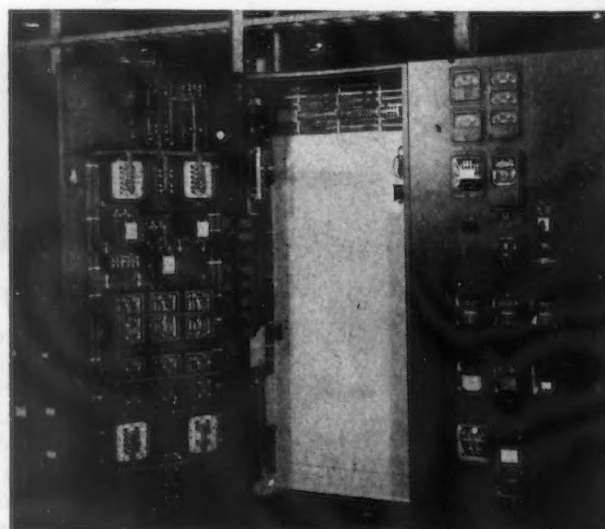
DESIGNED for controlling temporary power and light circuit through a central unit protected by circuit breakers, a scatter box has



been developed by *Square D Co.*, 6060 Rivard Street, Detroit 11. The unit is built for from 4 to 8 circuit with or without neutral. Circuits are protected by 15 amp., 115 volt single pole, type MO multibreakers (circuit breakers) although 20 or 25 amp. breakers can be substituted.

Metal-clad Switchgear

A METAL-CLAD switchgear with self-contained panels which carry instruments, relays and control equipment has been announced by *Westinghouse Electric and Mfg. Co.* All panel mounted devices are flush type and the relays are the new Flexitest or detachable design with self-contained test switches. The test switch blades also serve as disconnecting means which permit quick removal of the chassis carrying the relay element and enables the maximum accessibility to all parts.



HARDINGE

High Speed Precision

LATHE

is designed for accurate
tool room work

Designed to meet requirements of extreme lasting accuracy, high spindle speeds and the ease in operation required for the smaller diameter work range found in every tool room, laboratory and production department.

The simplicity of operation enables relatively unskilled operators to produce parts to the necessary close limits without expensive tooling. Your larger, expensive equipment will not meet all of the foregoing requirements necessary for practical results and proper economy.

Because of the many advantages found through actual use, Hardinge Precision Lathes are being installed in ever increasing numbers.

HARDINGE
ELMIRA, N.Y.



SPECIFICATIONS:

1" collet capacity, 9" swing, 17" center distance, eight spindle speeds from 100 to 4000 r.p.m.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

• The week's news from Detroit features a new bus by Consolidated . . . Reports of cutbacks on aircraft contracts . . . A viewpoint on postwar steel . . . New weapons. . . The trends in tool buying.



DETROIT — Consolidated-Vultee Aircraft Corp. is the first positive entrant into the postwar automotive field. The proof is not in a small car, which may come later, but a big bus, a lightweight job contracted for by Greyhound Corp. Delivery of an initial experimental model is hoped for some time next year and if it and two others are satisfactory they will be followed by volume orders. Obviously, Consolidated-Vultee would not produce an experimental job of this magnitude if definite plans were not in mind, and perhaps definite promises.

The Consolidated bus will be the first indication of aviation thinking on highway vehicles and will include a variety of innovations. Primary among these will be an aircooled engine, probably somewhere around 250 hp., the first aircooled power plant to go into a highway vehicle since manufacture of the Franklin was discontinued in the twenties. This engine will be mounted as in aircraft, permitting its complete removal from the body shell whenever repairs are necessitated, and substitution of a spare engine if need for the equipment is pressing.

Rib and spar construction of the type employed for aircraft wings will undoubtedly be used for the aluminum body, and the body will be closely integrated with the frame. The bus will seat 50 persons compared with 41 in present Greyhound cruisers. They will sit on two levels as against the present one level.

A bus of similar capacity and similar exterior lines has been ordered from GMC Truck & Coach Division by Greyhound, whose styling ideas were reportedly carried out by Raymond Loewy. The GMC product will be powered by diesel engines, primary nominee of that producer for postwar bus use, and will use rather orthodox construction.

Some reports have it that North American Aviation Co. also hopes to get into the experimental bus model race, but no deal appears to have been arranged as yet.

Greyhound quite obviously is putting aircraft and automotive techniques against each other in a situation which becomes the more intriguing when it is recalled that in the years before the war Greyhound lines and GMC had a hard-and-fast understanding on sales with each other. Either that agreement's life has now ended, or else Consolidated is doing development work with the permission, and even benison, of GMC.

Airplane Shrinkage

Many airplane programs appear to be facing into the same kind of shriveling which beset a good deal of the

ordnance planning a year or so ago. One of the largest producers of engines has had its contract cut back approximately 5000 units, advancing the job's cleanup by several months. This particular producer has another engine job on its books, a more advanced model, so it will not suffer too seriously. But the cutback is indicative; and there are others of less magnitude.

Willow Run, meanwhile, does not feel that the decline in its working force predicted in a recent statement by an Air Force general will be as great as anticipated. In fact, the return of previously subcontracted work to Willow Run in the months ahead, while final assembly schedules are reduced, probably will act to maintain payrolls fairly well. Despite this likelihood employees at the bomber plant are leaving for places they consider more stable, and the suddenly enlarged quit rate is creating quite a problem for Ford officials.

Interesting in this connection is the fact that one of the prominent firms in the aircraft field is letting the very discreet word drop here and there that it would not be the first to take on subcontracts in its machine shops.

THE SLIPPERY WEASEL: A new version of Studebaker's "Weasel," weapon and personnel carrier, moves through water or swamp in addition to negotiating the most rugged terrain. The M-29 C has a boat-shaped body, and rear rudders to aid maneuverability, but otherwise is the same as the M-29 land-going Weasel announced recently. Propulsion in water is from the continuous circuit track which moves the vehicle over land. A modified Studebaker Champion engine is employed.





Official U. S. Navy Photo.

A SCREW THREAD "TASK FORCE" THAT HELPS YOU WIN *PRODUCTION BATTLES!*

We hear a lot about *teamwork* in this war . . . amphibious and triphibious operations . . . the coordination of land and air and sea forces.

There are similar "task forces" of men and machines and tools in industry, too. Threading metal parts, for example, must be done at high speeds and at accuracies measured in ten-thousandths of an inch or even finer. This has meant the development of a "team" of high speed precision taps and dies to cut the threads . . . plus gages to check the accuracy.

"Greenfield" has devoted itself to the perfecting of this screw thread "task force". It has a country-wide staff of field engineers . . . its "intelligence" . . . continually bringing in reports of operations. It has its "headquarters staff" of trained screw thread and gage engineers to turn these field reports into blue-prints and plans . . . and it has a highly skilled "army" of men and women with the equipment to turn blue-prints into tools . . . the "Greenfield" Taps, Dies, and Gages that together form screw thread "task forces" in the plants of America's metal-working industry.



GREENFIELD

Better Threading with Better Tools

GREENFIELD TAP & DIE CORPORATION

GREENFIELD, MASSACHUSETTS, U. S. A.

The sight of an aircraft concern looking for subcontracts is on the face of it as mixed up as a metaphor about not letting the left hand know that the right shoe is going on the left foot.

One Man's Opinion

Here is the capsule opinion of one of the auto industry's prominent engineers on the subject of postwar uses of steel:

National emergency steel will be dropped like a hot potato as soon as full alloys can be obtained. The future of needled steel is quite questionable at this stage.

The auto industry's chief worry on the score of steel is the much-publicized fear that deep-drawing sheets may not be available.

Steel companies will certainly have to stand back of the quality of their product, and if breakage of deep-drawing sheets is as bad as some quarters fear, the mills may have to make rebates of worrisome size.

In any event for six months or so after automobile production resumption is permitted, the industry will probably have to take whatever steel is available, and be glad it can get even that.

That is the thesis; an antithesis should be drawn also. Steel offices say, first, that they will be able to produce low carbon, residue-free steel for deep-drawing sheets without exorbitant breakage. They expect to do this by duplexing, and by comparatively heavy charges of pig.

On the score of needle steel, some of the enthusiastic adherents of these specifications—including other prominent automotive engineers—maintain that they will be so widely used as to reduce alloy specifying to miniscular proportions. Improved heat treating cycles, too, are being looked upon by some companies as a means of reduc-

ing their alloy requirements in postwar years.

Fashions for Fighting

Ordnance lifted the grey hand of censorship this week from a number of the new weapons used in the European invasion, thereby signifying certainly that these vehicles have been captured and examined by the enemy. Two were of particular interest to the automotive community, the Studebaker Weasel (see illustration) and the Buick tank destroyer.

Studebaker's Weasel does all that its name implies; its wide track plods it across rivers, sloshes it across swamps, and snakes it up hills so steep that at least one load of Army personnel baled out on an initial ride, out of the dread belief that the next instant the whole vehicle would turn end-to-end turtle.

The other job is the Buick Hellcat, the 19-ton M-18 tank destroyer. This job rides at 55 miles per hr. on level ground, and plunges through woods, shallow waters and rugged going like a Notre Dame full-back in a warm-up game. Springing of the wheels is by torsion bar, a method which has met with such success by ordnance in several applications that it is being stud-

ied for possible postwar application by several car and truck companies. The M-18 also has a GM. "torqmatic transmission" and on this subject it can be remarked that the infinitely variable transmission designs of recent years may exercise the widest possible influence over postwar car design a short year beyond reconversion.

Trends in Tools

Orders for machine tools have begun to be placed by most of the automotive companies acting on the July 29 enabling order of WPB. The delivery promises are mixed. For ordinary standard tools promises average from 4 to 5 months, but this promise is out-balanced by longer terms for heavier equipment like big boring mills, and by the fact that it is extremely difficult to place orders for special machines which have an early chance for delivery. As was pointed out at one plant last week, the obtaining of 90 per cent of a tooling order can be completely futile if the remaining 10 per cent is unavailable. However, a WPB promise to give priority aid to machine orders which cannot be filled otherwise has not yet been tested, and it may save the day.

AAF Materiel Command Is Surprised

Wright Field, Ohio

• • • Photographic engineers of the Army Air Forces Materiel Command simply couldn't believe their eyes.

A 37-millimeter cannon had been fired point blank at a tire braced in a wooden rack, yet after the explosion the tire stood without apparent damage. "We missed," said one technician leaning against the casing. A second later he bounded away with a yowl of pain. The tire was hot.

Examination disclosed two small slits in the sidewalls marking the passage of the cannon shell. It had not missed after all. Yet the tire, the experts found, was good for 100 miles travel after being hit in such a fashion.

The engineers hurried to develop pictures taken with micro-flash photographic equipment capable of exposures down to one two-millionth of a second. The prints showed large holes plowed in the tire at impact, with what seemed in the picture only a thin film of rubber left at the thread.

This particular tire, which illustrated graphically the quality of Uncle Sam's military equipment, had been in combat use for many months. Its self-sealing properties developed by the tire industry and the Materiel Command, had done their bit toward victory.

The incident illustrates just as graphically how experts of the Engineering Division of the command use photography to determine just what happens to equipment under test. They know they can't believe their eyes.

Cutbacks by Type of Plant

... The CIO United Auto Workers Union has completed a survey of cutbacks in plants where it has membership. Details of the survey, as printed in a recent Research Bulletin of the UAW, are as follows:

INDUSTRY	No. of Plants Surveyed	No. of Plants Cutback	Peak Payroll	Present Payroll	Per Cent Decline
Shells & Ordnance	37	23	81,222	59,311	26.2
Aircraft Assembly	22	14	331,050	255,935	22.4
Tanks	20	9	50,824	44,244	12.9
Aircraft Parts	71	38	113,700	99,700	12.3
Aircraft Engines	26	14	187,555	179,667	4.2
Trucks & Agricultural Implements	44	20	46,324	40,953	11.6
Tool, Die & Machine Shops	60	28	22,018	16,909	23.1
Forges & Foundries	29	7	16,722	13,477	19.0
Miscellaneous	138	44	75,674	67,250	11.1



STANDARD PATTERN WORKS NOW USE *Carburs Exclusively*

Carburs are the ideal rotary files for pattern shop work . . . as now evidenced by their use at Standard Pattern Works—one of the leading concerns of this type in the Detroit area. Says Mr. E. J. Swink, president of Standard Pattern, "We find that Carburs are excellent tools for our type of work. Those that we have had in use since our first order was placed months ago still show little or no evidence of wear. We have been able to greatly reduce burring and cutting time on aluminum and brass because these tools can be run faster and there is little clogging of chips in the teeth to reduce cutting efficiency. We are now using them exclusively on all operations where a rotary file can be used."

Carburs—industry's first cemented-carbide rotary files—are now available in twelve standard shapes, each in from four to six different sizes and from fine to coarse cut. Special shapes and sizes can also be produced to meet specific needs. A new booklet contains complete information. Write for your copy today.

A FULL YEAR'S USE WITH THIS ONE CARBUR

A year ago, Standard Pattern Works secured one Carbur for trial purposes. It was turned over to one man in the shop who found continuous use for it. It was on the strength of his enthusiasm for this tool that more Carburs were purchased. Recently even with other Carburs on hand, it was with reluctance that he parted with his original tool so that it could be resharpened (at a Lincoln Park man's suggestion) at the factory. As far as he was concerned, it still was doing a good cutting job.



LINCOLN PARK INDUSTRIES, INC.

Successor to The Lincoln Park Tool and Gage Company and Carbur, Inc.

1729 FERRIS AVENUE • LINCOLN PARK 25, MICHIGAN

Washington . . .

L. W. MOFFETT

• **Able businessmen may shy away from Washington as result of recent WPB brawl . . . Maury Maverick challenges the Steel Division's estimate of fourth quarter steel supply.**



WASHINGTON—One sure result of the latest WPB brawl is that it is going to be increasingly difficult to get business men to Washington to take government jobs.

Many men with good reputations in industry have come to Washington to be smeared with the political goo, and have departed disillusioned and frustrated.

It is reported that the President would like to get some of the business men back who have already left WPB. A lot of unqualified noes can be expected.

Industrialists now in Washington are mostly on assignment to prevent what industry calls the "long hairs" from "taking over."

Not only those men from industry in WPB who may leave because of inside politics are expected to shake the city's dust, but everyone who can beg off will probably do so now.

* * *

Surplus Property Administrator Clayton says he won't resign because of sniping.

"Critics don't bother me," the genial ex-cotton broker smiled. "I've been in Washington long enough to develop a tough skin." He'll need it.

* * *

Business men, who are relatively new to the scene, complain that government agencies coin intrigue like a mint. They shouldn't be surprised.

To deny bureaucrats their prerogative of petty plotting and throat-cutting would take away all the zest of working for the government. The gleeful plying of scalpels by the ma-

jority of bureaucrats is their sole escape from the boredom of regular government work.

Consequently, when WPB's new Acting Chairman Krug undertakes a vendetta against all snipers and inside politicians and vows that feudists will be fired, he may have to decimate the agency.

If this policy were applied to all departments of government, Washington would become a ghost-town, and its hundreds of miles of marble corridors the happy domain of rodents and insects.

* * *

Reconversion is bogged down, but the President just said it shouldn't be.

A new more reasonable note is being detected at the Pentagon which after all seems to be in control of the situation.

It's just possible that WPB Acting Chairman Krug has orders to come forth soon with a whole rash of directions relaxing restrictions on civilian production.

If he does this, then War Manpower Commissioner Paul V. McNutt is going to be on a rather nasty spot. The reason is that under the Byrnes manpower directive to WMC, Mr. McNutt has the final say on the start or increase of civilian business.

WMC has taken on new dignity with its first real grant of authority. But if Mr. McNutt places too stern an interpretation on the Byrnes directive,

then he has a good chance of getting blamed for any economic debacle which may arise therefrom.

Mr. McNutt seems to relish his whipping-boy post. At least he has not quit.

* * *

There is speculation that the Mead Committee has invented a better mouse-trap, if the well-beaten path to its doors from the War and Navy Departments mean anything.

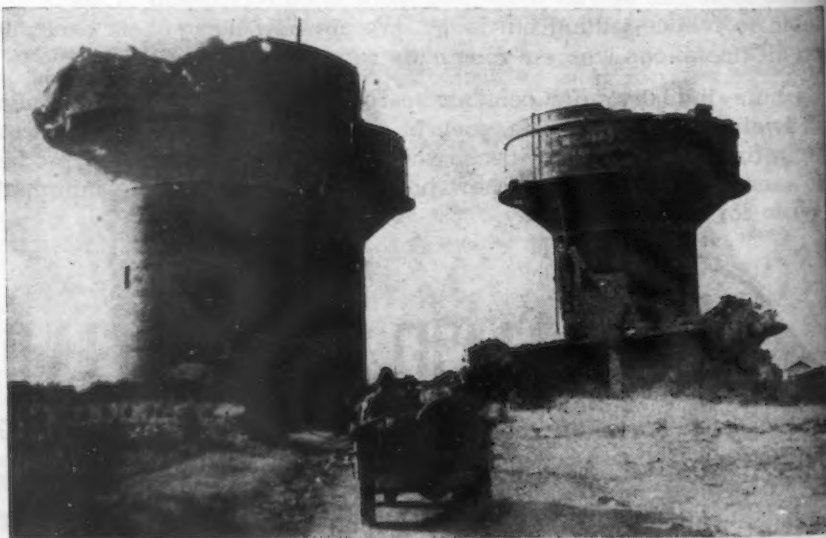
Generals, Colonels, and high-ranking Navy men are customary figures at the committee's hearings. Even when the War and Navy Departments are not apparently involved, Army and Navy officers, and even WAVES are interested spectators. For some reason WAC has not shown much interest.

Three months ago, the War Department thought that there was a 100,000-man worker shortage in munitions industries. Six weeks ago War Mobilizer James F. Byrnes said that there was a 200,000-man shortage for this year.

WPB Chairman Donald M. Nelson told the Mead Committee in a closed hearing that the 1944 shortage is 100,000 workers in munitions industries, and 100,000 in sustaining civilian industry. One week ago, OWI quoted WMC that there is a 400,000-man shortage.

Between the Byrnes and the OWI statement, it leaked out of WPB that the aircraft industry is expected to

FLAK TOWERS: *Three of four huge flak towers, which the Nazis used to guard Marine barracks near Angers, France, remain standing after having been damaged and knocked out of commission by U. S. air and ground attacks. The fourth (right foreground) was completely demolished.*



ONE OIL CHANGE
and this "chaser" tapped
10 TIMES
AS MANY SHELLS!



SUNICUT

permits 21,600 more pieces per chaser

Twenty-four thousand shells instead of twenty-four hundred per chaser life! A big saving in tool setter's time . . . a big increase in output per machine tool. All because a large manufacturer of high explosive shells changed the cutting lubricant on a tapping operation to Sunicut, the transparent, sulphurized cutting oil developed by Sun Oil Engineers.

Greater production demands required that they tap more shells per chaser grind . . . more shells per chaser life. So they asked Sun Cutting Oil Engineers how it could be done. Sunicut was the answer . . . the proof is in the results.

With Sunicut . . . output increased from the old rate of 600 pieces, to 4300 pieces per chaser grind . . . and from 2400 pieces, to 24,000 pieces per chaser life. In addition, finish was improved.

Sunicut's advantages are extremely high heat-absorbing and metal-wetting ability, and clearer work visibility. These make possible longer tool life, greater speeds, finer finish, and increased operator interest. Find out what Sunicut can do in your own plant . . . under your own operating conditions. Consult a Sun Cutting Oil Engineer, today. Write
SUN OIL COMPANY • Philadelphia 3, Pa.

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

lay-off 300,000 workers by December. The War Department had previously fixed the figure at 120,000 men.

Here's a typical case of government confusion. WMC officials in the know, call the OWI blurb a "misrepresentation."

Of course, it can't be said because the aircraft industry is going to discharge 300,000 men that whatever manpower shortage there is will be immediately alleviated. There is the matter of geographical location of plants and the fact that the freed manpower may be difficult to channel where it is wanted. Then there is the question whether the added labor force has the skills needed in industries which are said to be short of men.

One place the Army admits it has miscued is in buying medical and dental supplies and equipment. The government is supposed to have about \$264,000,000 worth of surplus property in this category.

This fact would seem to demolish the dream of high grade tool steel makers that there will be a tidy post-war market in surgical-grade steels. One hope is that much of the surplus equipment is abroad, and in addition,

that much will be retained by the services.

The employment gap between war production and reconversion, and attendant decreased consumer buying power has got the War Food Administration on its ear. Surpluses are so huge now, and food spoilage is so serious that the government is renting quarries and caves which are easy to refrigerate. Warehouse space is at a premium.

A visiting manufacturer explains the lag in military schedules by the fact that the services expect to get delivery "yesterday on things ordered today."

Maury Maverick, who heads up the Smaller War Plants Corp., is not only famous for such corny personal publicity as keeping a swarm of bees in a glass case in his office, but he has a reputation for courage.

Maury, who is easily the most colorful figure in local officialdom, is rotund and voluble, stocky and excitable. He has a flair for flowery phrases; his conversation is interpolated with sweeping gestures.

In recent months, Mr. Maverick has been the staunchest supporter reconversion has had. With a willingness

to tackle a buzz-saw, he has gone to the mat with the biggest wigs in the Army and Navy who have opposed an early reconversion.

Naturally, with all his zeal and enthusiasm, "Maury" sometimes tilts at windmills. At a WPB Requirements Committee meeting a short time ago, "Maury" challenged the Steel Division's estimate of fourth quarter steel supply.

The Steel Division had opposed the "spot authorization" plan because it was not possible to create a reserve upon which manufacturers could draw to take advantage of the plan.

The Steel Division submitted an estimate of operating rate of 94 or 95 per cent, and allotments were issued for 110 per cent of capacity. Undaunted by this, Maury insisted the Steel Division's supply estimate was too low, and offered to prove that it will be 97½ per cent. He was after that reserve for reconversion.

Appointed Counsel For Contract Board Washington

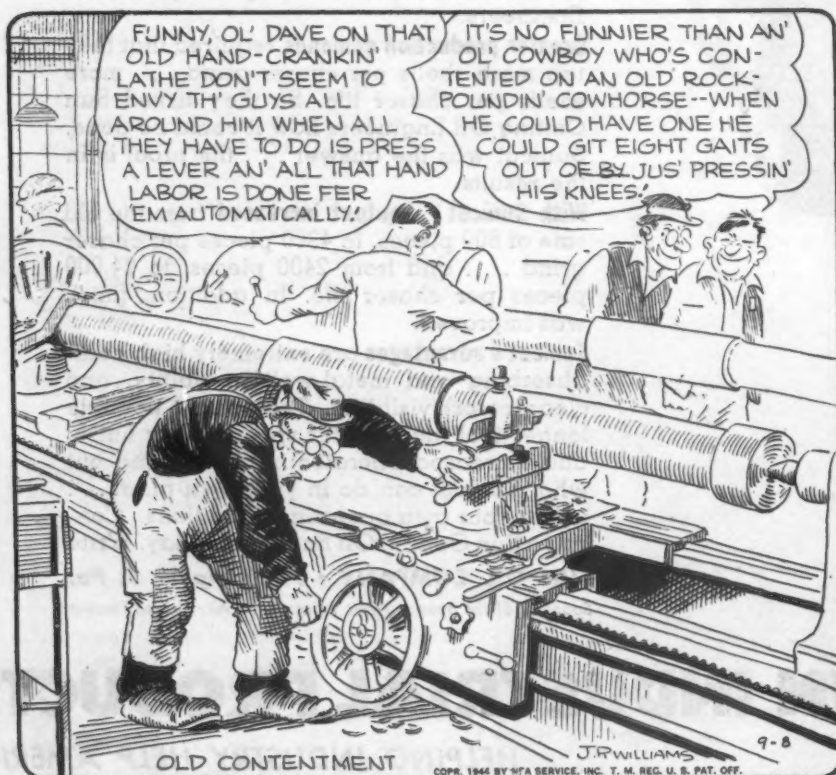
• • • Frederick W. R. Pride, counsel for the Navy Price Adjustment Board, has been appointed general counsel for the War Contracts Price Adjustment Board. He succeeds W. James MacIntosh, who has resigned as counsel of the War Contracts Price Adjustment Board and the War Department Price Adjustment Board to return to his law practice in Philadelphia. Mr. Pride was formerly a member of the New York law firm of Dwight, Harris, Koegel and Caskey.

Lieut. Col. William Wadsworth Watts, who has been assistant general counsel of the War Department Price Adjustment Board, has been named general counsel to succeed Mr. MacIntosh. Colonel Watts was formerly a member of the law firm of Ross and Watts, Chicago.

Brig. Gen. Albert J. Browning, Assistant Director of Material, Army Service Forces, will be the War Department's representative on the War Contracts Price Adjustment Board, succeeding Joseph M. Dodge, who has resigned to resume his position as president of the Detroit Bank, Detroit. Mr. Dodge will be succeeded in his position as chairman of the War Department Price Adjustment Board by Col. Maurice Hirsch, Houston, Tex., who has been associated with the War Department Board since October, 1942, and who has been its vice-chairman since Sept. 20, 1943.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



How many machine tool operations help to make him

the safest flyer in the world . . .

America spends more time, more money, more effort to protect the life of a flyer than any other country in the world . . . He is the unexpendable.

Into a single engine of his plane go as many as 84,000 individual manufacturing operations . . . to accuracies as fine as four-millionths of an inch.

And of all the machine tools in use by the aviation industry, none is more basic or more vital than the internal grinding machine. Bryant engineers have helped the men of government and of industry to plan the most desperate and gigantic production program of all time . . . and they can help those same men in planning today for the peace that must be won after the war is won! We invite you to send for a Bryant man today.



BRYANT

CHUCKING GRINDER CO.
SPRINGFIELD, VERMONT, U. S. A.



• Further aluminum production cuts free few workers for hungry demands of attack transport builders . . . Huge Navy additions to permanent facilities should have post war industrial implications.



LOS ANGELES—Box car figures and a self-imposed glamour have tended to attract more attention to and emphasis on aluminum than its weight or importance in the Far Western industrial picture probably deserve. At first glance, for Alcoa to produce 9,000,000 lb. monthly at its Los Angeles reduction plant, 8,000,000 lb. at Troutdale, Ore., and 18,000,000 lb. at Spokane, Wash., as it did in July, one would imagine that thousands of jobs were involved.

Last week, when further severe production curtailment was announced, it developed that there were only 608 employees at Los Angeles to operate the two remaining pot lines which are now being shut down.

By the new order the Los Angeles plant will be closed completely but 150 of the 608 employees will remain to clean up and stand by for 60 to 90 days at least.

By the same order, the Troutdale, Ore., plant is reduced to one pot line, about 1500 tons per month, and Spokane's six pot lines are now down to two, about 3000 tons per month.

These 400 odd workers released at Torrance were in such demand that the United States Employment Service had busses at the plant on pay day to try to tempt the separated gentry to the nearby Bohn plant and to the heavy tire plants of Goodyear, Firestone, U. S. Rubber and Goodrich—all hungry for help.

This seems to leave three pot lines operating out of 18 installed capacity in the four West Coast DPC aluminum plants under Alcoa's management.

Men and women workers are still desperately sought by shipyards, tire factories, foundries and aircraft plants in the essential brackets in this area, not to mention the service, transportation and so-called non-essential commercial fields so long bereft and forlorn of workers. As G. L. Fox, manager of the industrial department of the San Francisco Chamber of Commerce so aptly put it in his statement before the recent two-day hearing of the California Reconstruction and Reemployment Commission, "There are many homely, tiring and tedious jobs to be done, and we have lots of generals but hardly enough privates."

MARITIME shipyards at Wilmington, Richmond and Portland, with contracts for over 100 AP-5 Army-Navy attack transports, are being pressed with unprecedented passion by military authorities, from the Commander-in-Chief down, to accelerate and exceed their already tight

schedules. A seven-day week has been restored and a desperate recall for welders issued. An intensive drive for some 25,000 additional workers among all the yards building these vessels includes special attempts to re-enlist former workers. Average shipbuilding wages of \$1.43 per hr., and \$65.24 per week are barely enough to maintain the working force, and now it is necessary to accelerate in order to facilitate contemplated Pacific operations within the next 12 months.

AP-5 attack transports are Victory ship hulls specially outfitted and each requires over 1000 tons of ballast. After months of discussion and conference, with competitive pressures by the producers of pig iron, contaminated rough ingots and concrete, the final decision has gone to concrete fortified by iron ore which is poured directly into the bottom and set and hardened there.

FROM Fontana come reports of production activity showing that currently open hearth ingot production is reported at the rate of over 50,000 tons per month which is not far under the rated capacity of the

BLACK WIDOWS: Night fighters, called "Black Widows" because of the black paint covering them to lessen visibility, are taken to an assembly strip at a Pacific base of the U. S. Army 13th Air Force. They will soon be in action against the Japs.



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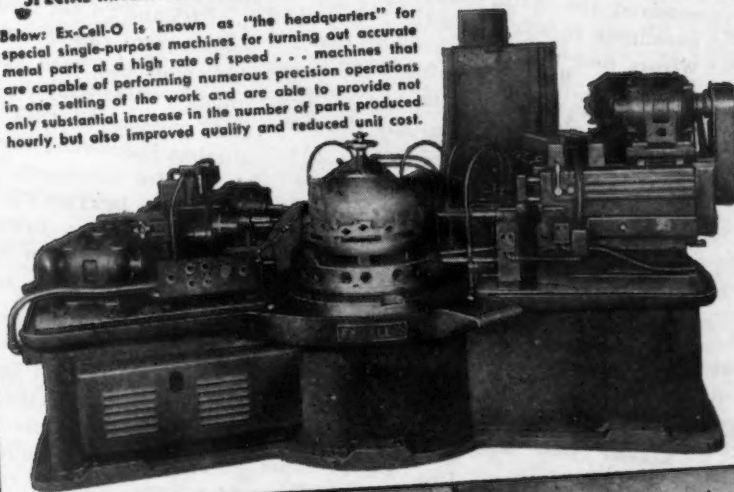


EX-

A File of EX-CELL-O Production Aids

SPECIAL MACHINES

Below: Ex-Cell-O is known as "the headquarters" for special single-purpose machines for turning out accurate metal parts at a high rate of speed . . . machines that are capable of performing numerous precision operations in one setting of the work and are able to provide not only substantial increase in the number of parts produced hourly, but also improved quality and reduced unit cost.

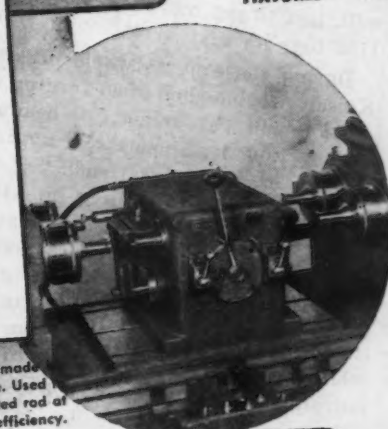


STANDARD MACHINES

Ex-Cell-O precision machine tools—for boring, turning, facing, thread grinding, broach sharpening, tool grinding, lapping—are sound in design and construction. The simplicity of their operation and the substantial

production they attain on an economical basis, make these Ex-Cell-O standard machines of practical interest to both the manufacturers who install them and to the men who operate them.

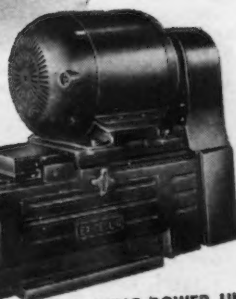
FIXTURES



To right: Typical set-up designed and made by Ex-Cell-O for standard boring machine. Used for semi-finish both ends of steel articulated rod at a high production rate with maximum efficiency.

GRINDING SPINDLES

Many thousands of Ex-Cell-O precision grinding spindles are in daily use throughout American industry.

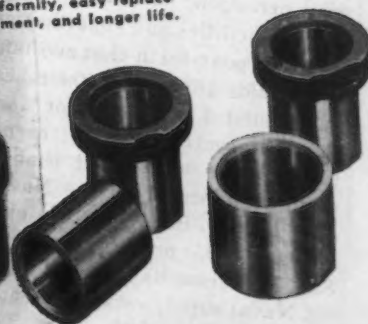


HYDRAULIC POWER UNITS

They provide an economical method of drilling, reaming, counter-sinking or spot-facing. Also may be used as prime movers or drivers for other machine units.

DRILL JIG BUSHINGS

Ex-Cell-O drill jig bushings (A.S.A. Standards) are made with accuracy, assuring absolute uniformity, easy replacement, and longer life.



CONTINENTAL STANDARD and SPECIAL CUTTING TOOLS (High Speed and Carbide)



IN your production plans for now and the future, take advantage of Ex-Cell-O's substantial background of practical engineering experience in the designing and manufacture of precision machine tools and Continental cutting tools. Send for your free copy of General Products Folder No. 27132.

EX-CELL-O CORPORATION
DETROIT 6, MICHIGAN

XLO

EX-CELL-O for PRECISION

SPECIAL MULTIPLE WAY-TYPE PRECISION BORING MACHINES • SPECIAL MULTIPLE PRECISION DRILLING MACHINES • PRECISION THREAD GRINDING, BORING AND LAPPING MACHINES • BROACHES AND BROACH GRINDING MACHINES • HYDRAULIC POWER UNITS GRINDING SPINDLES • DRILL JIG BUSHINGS • CONTINENTAL CUTTING TOOLS • TOOL GRINDERS • DIESEL FUEL INJECTION EQUIPMENT • R. R. PINS AND BUSHINGS • PURE-PAK MILK CONTAINER MACHINES • PRECISION AIRCRAFT AND MISCELLANEOUS PARTS

mill. The new electric furnace turns out over 1600 tons per month and the foundry pours something like 2700 tons of casting. The new structural mills are in operation and the 36-in. mill rolled 17,000 tons in the second month of operation and has rolled as high as 1150 tons a day of four-ton shell billets. The 29-in. roughing mill, last to get into operation, rolled 1150 tons its first week.

During these next two months the Kaiser sizeable shell steel forging operation will get under full headway and by Nov. 1, shipments of approximately 60 railroad carloads per day of material will be rolling into Denver from Geneva and Fontana, to be fashioned into finish shell casings at the former Denver ordnance plant now under Kaiser lease and management. Discards resulting from the shell manufacture will add to the surplus of scrap on the West Coast.

FEW not on the ground can realize the extent of permanent new installations by the Navy on the West Coast, particularly in California, within the last few years. After years of Naval starvation and penny-wise privation, such a pound-foolish flow of facilities and superfluities continues to pour forth that civilians and gold braids alike shake their heads in dumbfounded wonder. For facilities alone in central and northern California, it is understood that money spent or allocated by the Navy since July 1, 1940, is now well in excess of \$350,000,000, probably making the San Francisco Bay region the greatest Naval supply establishment on the face of the earth. On Treasure Island, where the City of San Francisco hoped to operate an airport after the Golden Gate International Exposition was cleared up, are now over 40,000 uniformed personnel at the receiving station, and it becomes necessary to double the water supply with another 8-in. pipe line strung with difficulty under the Bay Bridge, this time from the Oakland side. As an auxiliary to the \$50,000,000 supply depot at Oakland created out of whole cloth these past few years, a \$25,000,000 depot is springing up at Stockton, 75 miles inland but on tide-water. In addition are two major construction and repair yards, two big air stations, three big hospitals, a whopping Seabee depot, a radar and communications operation, and a new Naval ordnance plant in the Mojave desert which will cost more than \$27,000,000.

Cited for Awards

• • • The following companies have received the Army-Navy award for excellence in war production:

Western Gear Works, Seattle. (third star)
Edward G. Budd Mfg. Co., Philadelphia. (fourth star)
Westinghouse Electric & Mfg. Co., Philadelphia. (fourth star)
United States Spring & Bumper Co., Los Angeles. (star)
Wales-Strippit Corp., North Tonawanda, N. Y.

Maritime M

Fort Pitt Steel Casting Co., McKeesport, Pa. (third star)
Westinghouse Electric & Mfg. Co., Merchant Marine Division, Lester, Pa. (second star)
Edward Valve & Mfg. Co., Inc., East Chicago, Ind. (fourth star)
Combustion Engineering Co., Inc., Heine Boiler Division, St. Louis. (star)
Condenser Service & Engineering Co., Inc., Scranton Pump Division, Scranton, Pa. (star)
Graham Mfg. Co., Inc., New York. (star)
Kennedy Valve Mfg. Co., Elmira, N. Y. (star)
National Radiator Co., Johnstown, Pa. (star)
Oil Well Supply Co., Oswego, N. Y. (star)
Stetson-Ross Machine Co., Seattle. (star)
Joslyn & Ryan, Naval Architects, San Francisco. (star)
American Hoist & Derrick Co., St. Paul. (fourth star)
Filer & Stowell Co., Milwaukee. (fourth star)
Hopeman Brothers, Inc., New York. (fourth star)
Kerotest Mfg. Co., Pittsburgh. (fourth star)
Koppers Co., Bartlett Hayward Division, Baltimore. (fourth star)
National Malleable & Steel Castings Co., Sharon, Pa. (fourth star)

Every separate project mentioned above is in the eight digit class, as are also the Navy bases on Terminal Island, Los Angeles and at San Diego. In addition are scores of auxiliary air fields, fuel depots, drydock training centers and a variety of miscellaneous establishments, almost everyone complete with gymnasium and swimming pools. The emergency rebuilding of the ammunition shipping depot which was destroyed by an explosion at Port Chicago is involving over \$5,000,000 and so pressing is the need that actual work is way ahead of paper work and contractors are proceeding unprecedentedly on verbal authorizations and without the usually elaborate Navy routine and red tape. Postwar planners on the California coast cannot help feeling that a \$500,000,000 commitment by the U. S. Navy in physical facilities there together with the size and importance to the Navy of future Pacific operations will have a considerable permanence in jobs and commercial concomitants.

* * *

For the third time this year the 35,000 production and maintenance employees of Douglas Aircraft Co. at

its parent Santa Monica plant will be invited this coming month by the NLRB to vote on whether they wish an organized collective bargaining representative and if so which. Last February employees voted 39.7 per cent against any union, 34.4 per cent for CIO and 26 per cent for AFL. In a subsequent run-off between CIO and non-union 53.3 per cent voted non-union. CIO United Auto Workers then complained that the AFL Machinists had swung their vote and influence for non-union. It is now held that the intervening months have given the union organizers time to swing the pendulum for someone.

* * *

Donald Douglas has been telling his own employee-management committee members that C-54 four-engine transports will carry the bulk of transoceanic shipments postwar and that they will be building these planes for some time to come. He is also counting on continuing DC-4's and DC-6's at Santa Monica.

War Products Sales 58.2% At International Harvester

Chicago

• • • Sales of war products and civilian products by International Harvester Co. were approximately evenly divided in the three months ended July 31, the third quarter of the company's fiscal year, Fowler McCormick, president, said recently in the company's quarterly review. War product sales were 58.2 per cent of total sales in the first six months of the current fiscal year compared to 71.1 per cent in the final six months of the 1943 fiscal year. Liberal production quotas for service parts have raised the sales of these items to an all-time high, Mr. McCormick declared.

Total sales for the first nine months of the current fiscal year have continued at a level substantially higher than for the corresponding period of 1943, according to the report. The company will have completed 96 per cent of authorized production of farm equipment by Sept. 30, the expiration date of WPB Order L-257 for the 1943-44 season. The government continues to take 85 per cent of Harvester's track type tractor output, the report showed. Production of ball bearings at the company's new plant will commence this month, approximately doubling the company's present capacity and providing for manufacture of many new sizes.

**FRONT PAGE
NEWS!**

HydrOILic "PRESS"

**LATEST
EDITION**

★ **INDUSTRY'S RIGHT HAND FOR PRESSING** ★

Columbus 16, OHIO

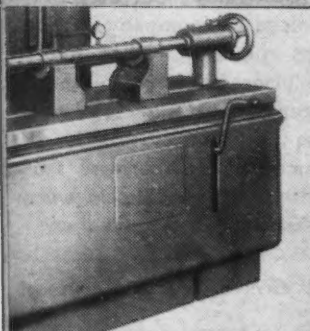
SPEED, ACCURACY, ON STRAIGHTENING JOBS

PRESS HAS MANY SAFETY FEATURES

**Design Eliminates
Operating Hazards**

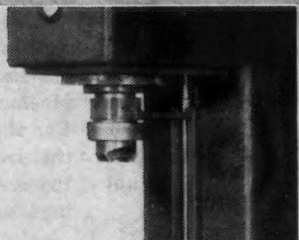
Many Safety Features Noted

Safety is advanced as much as efficiency in the DLSC2 Presses. All mechanism is enclosed and protected by the streamlined frame. As an additional safeguard, corners of the frame have been rounded wherever possible. Ample toe space is provided at the base of the press to give the operator easy, sure-footed access to the work-area. As in all HydrOILic presses, the complete elimination of hazardous, projecting controls or mechanisms is a distinguishing feature of the DLSC2 series.



DLSC2 Easy To Pre-set For Volume Production

For efficient handling of volume production operations, the stroke and pressure of the DLSC2 HydrOILic Press can easily be pre-set. Tonnage limits can be fixed at any point from approximately 10% of capacity up to maximum. Ram stroke can be set at any point up to maximum. And, regardless of the stroke and pressure limits for which the press may be pre-set, the hand lever provides full control of ram action within those limits.



the stroke and pressure of the DLSC2 HydrOILic Press can easily be pre-set. Tonnage limits can be fixed at any point from approximately 10% of capacity up to maximum. Ram stroke can be set at any point up to maximum. And, regardless of the stroke and pressure limits for which the press may be pre-set, the hand lever provides full control of ram action within those limits.

DLSC2 Presses Permit Quick Pressure Changes Without Pre-Setting!

Featuring a direct-action hand lever with which both ram travel and pressure can be selected and accurately controlled "on the run," the DLSC2 HydrOILic Press is bringing extra speed and efficiency to a wide range of straightening jobs.

A large pressure gauge, mounted at eye-level, shows tonnages with rapid accuracy. The operator can see at a glance the exact tonnage being applied on the work . . . can fit the pressure to the job at hand without waste of time or motion. He finds it easy to work closely within the stress limit of any variety of materials, parts, or assemblies, without having to make changeover adjustments of any kind between operations.

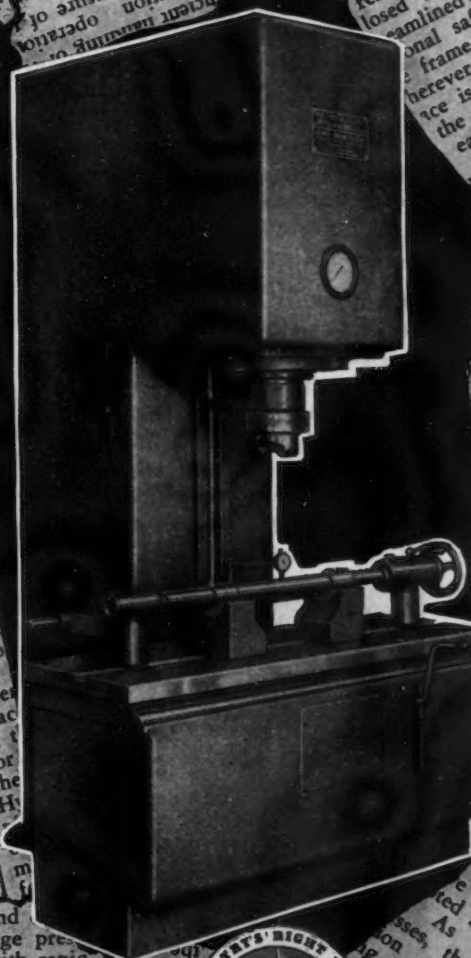
Ram Action Always Under Full Control

Instant, direct, continuous control of the ram action, provided by the convenient hand lever, presents a number of operating advantages. Tonnages can be increased steadily or step by step . . . slowly, or at full speed . . . in a single thrust, or in repeated thrusts without waiting through a full stroke of the ram on each thrust. It also permits the operator to "idle" the ram at any position up to the point of pressure application.

Another feature of the DLSC2 HydrOILic Press is its space-saving compactness of design. All operating mechanism is enclosed within the frame, and all moving parts operate in a bath of oil.

New Data Sheet Offers Complete Details

The DLSC2 Series includes presses of 25, 50, 100 and 150-ton capacities. Other standard-type HydrOILic Presses are available in capacities of from 5 to 200 tons. Complete up-to-date information on HydrOILic Presses for all standard types of operations is now obtainable in a series of illustrated data sheets. Write today for your free copy of the bulletin on the DLSC2 Press, or for data sheets on HydrOILic Presses for other operations. The Denison Engineering Company, 1158 Dublin Rd., Columbus 16, Ohio.



DENISON
EQUIPMENT in APPLIED
HydrOILic



THOMAS JASPER, technical and research director, General American Transportation Corp.

• **Thomas Jasper** has been named technical and research director for the General American Transportation Corp. with headquarters in Chicago. Mr. Jasper was previously associated with the A. O. Smith Corp. as director of research, a position that he had held for the past 18 years. Mr. Jasper's work at General American will be to assist and collaborate with the engineering, production and sales groups of the corporation.

• **J. M. Cook** has been made manager of the San Francisco district sales office of Cutler-Hammer, Inc., Milwaukee. He joined the organization in 1928, and has handled the sale of all Cutler-Hammer products for all classes of industry.

PERSONALS

• • •

• **John W. Scallan** has been elected vice-president of Pullman-Standard Car Mfg. Co., in charge of sales of transportation equipment and war materiel in Chicago and the Middle West. Mr. Scallan has been with Pullman-Standard for 18 years having joined the company in 1926 as a sales agent. Six years later he was made sales manager of the Western district and in 1942 he became an assistant vice-president.

• **Dr. Wilbur A. Lazier**, of Wilmington, Del., research chemist, has been appointed director of the Southern Research Institute, Birmingham, Ala. Dr. Lazier has been in the chemical department of E. I. du Pont de Nemours & Co. since 1925.

• **E. E. Quimby** has been elected to the position of commercial vice-president, specializing in sales transactions for Economy Pumps, Inc., Hamilton, Ohio. For several years Mr. Quimby was sales manager for the Quimby Pump Co., New York, and later was vice-president and general manager of the Sundh Electric Co., Newark, N. J.

• **Raymond J. Cowden** has been appointed general contract manager of American Propeller Corp., Toledo, Ohio, in complete charge of contracts and service for American Propeller blades throughout the United States and in foreign countries.

• **William B. Avery** has been appointed personnel assistant to W. S. Fraula, operating assistant to the president, American Brake Shoe Co., New York, to aid in problems relating to personnel and labor relations. Mr. Avery, who joined Brake Shoe July 1, was formerly assistant chief, employee relations branch, Civilian Personnel Division, Office of the Secretary of War, Washington.

• **Steven Spitler** has been appointed assistant to the president of Ross-Meehan Foundries, Chattanooga, Tenn. For the last two years he served with the iron and steel branch, Office of Price Administration, as chief of castings and fabricated products section.

• **H. Church** has been appointed vice-president in charge of sales for The Weatherhead Co., Cleveland; **George H. Hufferd**, vice-president in charge of engineering, and **Robert P. Gibson**, vice-president in charge of automotive sales for the company. **Morris H. Wright** has been made the new assistant to the president. Mr. Church joined Weatherhead in 1936 as sales engineer and later became the manager of the aviation sales division. George H. Hufferd, a former chief engineer of Thompson Products' Detroit Division and executive engineer of Houdaille-Hershey's Corp.'s Buffalo Division, joined the company as chief development engineer in 1943. Robert P. Gibson, prior to his appointment, was manager of the company's industrial sales division. Morris H. Wright came to Weatherhead from the Acme Steel & Malleable Co. where he was assistant general manager.

ROBERT P. GIBSON, H. CHURCH and GEORGE H. HUFFERD, left to right, have been elected vice-presidents of The Weatherhead Co.



• **Joseph A. Zerkel**, for the past ten years alloy metallurgist at the Indiana Harbor plant of Youngstown Sheet & Tube Co., Youngstown, Ohio, has been appointed metallurgical engineer of the Milwaukee Forge & Machine Co., Milwaukee.

• **Fred L. Curtis** has been appointed manager of the Sales Engineering Department of the Norton Co., Worcester, Mass. Mr. Curtis has been with Norton for 16 years, first as abrasive engineer in Jackson, Mich. and for the last 5 years as abrasive engineer in Detroit. **Fred W. Grant** has been appointed merchandising engineer. He also will be located in Worcester. Mr. Grant has been with the company for over 30 years and for the last 19 years has been abrasive engineer in the Milwaukee territory. **Paul H. Carlson** has been appointed abrasive engineer for Milwaukee succeeding Mr. Grant and **E. C. Willey** has been appointed abrasive engineer for the Moline, Ill., area succeeding Mr. Carlson.

• **Victor F. J. Tlack**, pioneer developer of cobalt chromium steels and tool steel jobbing executive, has been appointed consultant and special representative of the sales department of Latrobe Electric Steel Co., Latrobe, Pa. Mr. Tlack until recently served as president of Darwin & Milner, Inc., Cleveland, having been associated with that firm for almost 30 years. Mr. Tlack will make his headquarters at the company's Cleveland office.

• **Alexis J. Diakoff** has been appointed consulting engineer of the diesel engine department of the Schenectady plant of American Locomotive Co. Mr. Diakoff comes to American Locomotive from the University of North Dakota where he was head of the Mechanical Engineering Department.

• **T. W. Tinkham** has been appointed general manager of the Eclipse Machine Division of Bendix Aviation Corp., Elmira, N. Y. Mr. Tinkham, succeeds **William L. McGrath**, who is retiring as general manager of Eclipse after 28 years of service with this division. Mr. McGrath will continue as vice-president and a director of the corporation.

• **R. S. Wheeler**, formerly with Remington Arms Co., Inc., Bridgeport, Conn., has been appointed sales manager of the Machinery and Equipment Division of The Louis Berkman Co., Steubenville, Ohio.



ALBERT H. CHARLTON, Eastern sales manager, Aluminum Division, Reynolds Metals Co.

• **Albert H. Charlton** has been named Eastern sales manager of the Aluminum Division of the Reynolds Metals Co., New York. Mr. Charlton began work for Reynolds in 1936, rolling sheet in the company's mills in Louisville, Ky. Later he became an assistant plant manager. He was made sales manager for the Philadelphia area in 1942 and remained there until his present appointment.

• **Mildred Ferguson**, formerly metallographer for the past 16 years at the Westinghouse Research Laboratories, East Pittsburgh, Pa., has become associated with the Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., as research metallurgist

and head of the metallographic division.

• **Harry S. Walker** has been made a member of the commercial engineering staff at the Westinghouse Bloomfield Lamp Division, Detroit, as sales representative on Mr. Kinley's staff. Mr. Walker joined the Westinghouse Lamp Division in Pittsburgh in 1937 and was a member of the Detroit sales organization from 1938 until 1942.

• **Orrin R. Broberg**, assistant manager of engineering service, Aircraft and Transportation Division, for Adel Precision Products Corp., Burbank, Calif., has been given a leave of absence to join the Office of Scientific Research and Development. He will make his headquarters in Washington, D. C. **Clay H. Hollister, Jr.**, has been appointed director of public relations for Adel. For the past five years he has been associated with Libbey-Owens-Ford Glass Co. as director of distribution research.

• **Robert E. Lewis** has resigned his position as treasurer of the American Steel & Wire Co., subsidiary of U. S. Steel Corp. He has been elected president of the Cleveland Wire Spring Co., Cleveland. In September, 1941, Mr. Lewis was made assistant to the treasurer of the American Steel & Wire Co. and the following May he was elected treasurer.

• **Brendan Sullivan** has been named advertising supervisor of General Electric's Resin and Insulation Materials Division in Schenectady, N. Y. Before joining G-E in September, 1942, he had worked three years for Lee-Stockman Inc., advertising agency, and three years with F. W. Dodge Inc., publishers.

OBITUARY...

• • •

• **Frank E. Hulett**, 68, president of the Hulett Engineering Co., died recently. He revolutionized dock-loading methods 18 years ago when he invented a loading pier that would do the work of 118 men.

• **Rupert K. Stockwell**, 62, widely known engineer, died Aug. 24 at his home in Oakland, Calif. Mr. Stockwell was head of the San Francisco office of the Robins Conveying Belt Co. He built mining plants in 24 countries throughout the world and lived many years in England, Russia, North Africa and China.

• **John P. Moses**, formerly manager of railroad sales for Joseph T. Ryerson & Son, Inc., died Aug. 18 in Chicago at the age of 73. Mr. Moses began with the Ryerson company in 1903 and served continuously for 41 years.

• **Mortimer E. Cooley**, dean emeritus of the University of Michigan Engineering College, died Aug. 25. Dean Cooley, a member of the U. of M. faculty for 47 years, was considered one of the most influential technical educators in the nation.

• **Loyall A. Osborne**, retired vice-president and director of the Westinghouse Electric & Mfg. Co., died in Pittsfield, Mass., Aug. 18.

Fatigue Cracks . . .

BY A. H. DICK

Brains Department Fans Out

. . . We have been saving the copies of the f.f.j. to be sent to the McGuire General Hospital here for the convalescent soldiers . . ., having faith that the good old f.f.j. would win in a walk for attention among the more erudite and forward-looking among our returned fighting men.

Then alas, I read the advertisement of the Pennsylvania Salt Manufacturing Co. on page 43 of the Aug. 17 issue. It states, "The first ship built in America, the Virginia, was launched from the shores of the Kennebec in 1607. The Bath Iron Works Corp. is carrying on the tradition of the Kennebec today . . ."

It is my recollection that the first English settlement at Jamestown was struggling for existence in 1607. Furthermore, my immigrant ancestor founded one of the first colonies in Maine at Wells and he didn't get over here until the late date of 1636.

Please explain before I ship this copy out to the hospital to pass before the critical eyes of a bunch of GI's.

—Thos. S. Wheelwright, Jr.,
Old Dominion Iron & Steel Works,
Belle Isle, Richmond, Va.

We are sorry to report that our fount of knowledge, the brains department, proved to be a dry well when tapped for information on early American shipbuilding, so we will have to look elsewhere. Meanwhile can the Pennsylvania Salt Manufacturing Co. submit any data to confound this critic?

Stoppers

• • • Made to be buried alive—*Morgan Construction Co.*

Praise from Sir Hubert

• • • Mr. Wheelwright's statement that he passes his copies of THE IRON AGE along for the use of hospitalized service men reminds us to mention that the Cleveland plan for using business papers in the rehabilitation of the war wounded is working as smoothly as a new razor blade. Checking copies received by the advertising agencies are passed along to the hospitals.



The photograph shows copies in use at the Crile General Hospital by (starting from the left) Seaman 1/cl. Carl Burrows, who was injured in England; Pvt. Melvin Bickford, Anzio beachhead; Staff Sgt. Frank Hunt, Burma; Pvt. Francis Browning, Africa; Pvt. Wm. F. Petty, England, and Pvt. James T. Dugan, U. S.

The plan, brainchild of John C. Stephan, Cleveland industrial advertising agent, has outgrown its original conception. From the way things are moving, material in the business papers is going to play a major role in the far bigger job of educating the millions of veterans for re-absorption into business and industry.

Suppose you were in uniform for a couple of years and had to bring yourself up to date on what happened in your profession while you were away. There would be no quicker and surer way of filling the blank than to go through back issues of your profession's

publication. But then, we are prejudiced, so we will let Mr. Stephan carry the ball. He lacks our bias, and we beg his pardon for the liberties condensation require us to take:

The technical, business or trade paper is a "sounding board" where new ideas are disseminated quickly, criticized, dis-assembled, re-assembled, discussed and studied. It, together with engineering society meetings, is first to announce advancements.

It is a forum of opinion, a place where minds from far distances, with a community of interests, meet . . . The business paper editor summons superior minds to work with him by contributing their experience and personal efforts for the common good.

Infallible memories are non-existent. Permanence of record is as vital as accuracy of reporting. Is there a substitute that can serve the same purpose as well? There is not.

If one of our own tribe had written that as an exercise in self-appreciation it would not now be before you. Ditto if it had been prepared to titillate the nostrils of us share croppers on the Fourth Estate. But it is a bouquet only incidentally. Mr. Stephan is a craftsman who uses many tools. It happens that he regards the business papers as the best tool for the purpose in mind. There would be no more reason for him to eulogize us than for a carpenter to rhapsodize on a ripsaw. Which makes the orchid doubly fragrant.

Scoop! Scoop!

• • • Speaking of craftsmen, we are happy to announce new evidence to support our contention that the less a man knows about his profession the more likely he is to employ trade jargon to mystify the layman. We know that this is true of young plumbers, surgeons, printers, advertising men, and trombonists, and if we got around more we might also be able to say that it is true of young painters, polo players, and paleontologists.

The new evidence is in a letter that just came in from the member of the brains department who is now in New Guinea. When he left us he said he would conceal the fact that he is skilled in the art of placing one word after another in coherent order, as he desired a complete change. He writes:

I suppose that sooner or later it was bound to happen, although I tried to avoid it. I'm editing again—this time it's a battalion weekly. Our publishing office is in the rear of a camouflaged recreation hut. With one hand I'm pecking at a typewriter, while with the other I am trying in vain to sweep away enough of the swarms of flying bugs, that plague us at eventide, to enable me to see the typewriter keys.

I'm the only one acquainted with the practical problems of getting out a publication, but everybody who passes by considers himself an undiscovered genius and persists in spouting off in an unintelligible tongue supposed to be newspaper talk, but all Greek to me. They probably picked it up from seeing too many movies with reporters constantly rushing in yelling, "Stop press! Scoop! Scoop!"

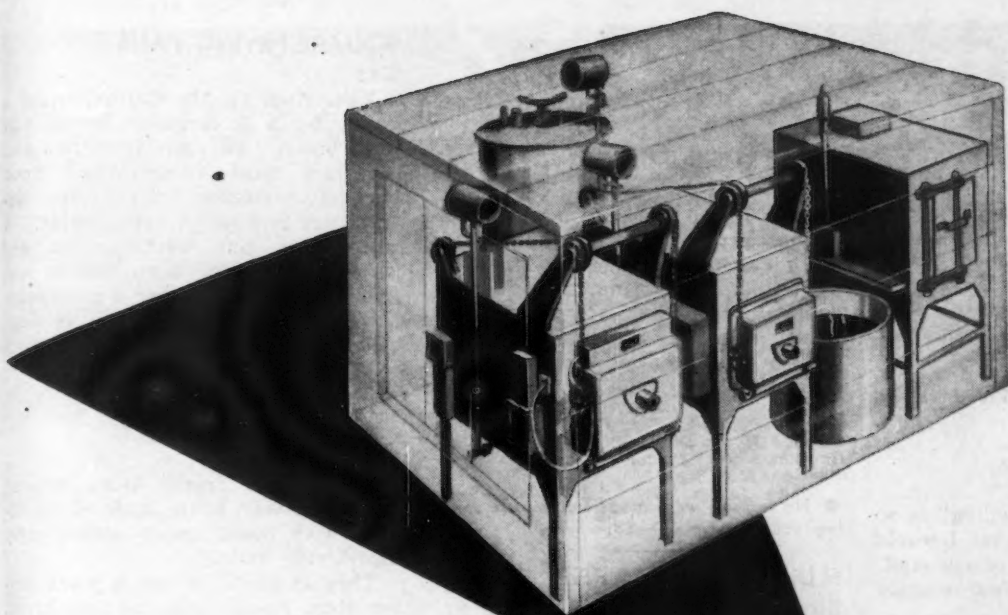
Puzzles

Last week's clock answered, "5 1/7 hours have passed." C. R. (Braeburn Alloy Steel) Cline gives us this answer to the one about writing five 3's so they come out to zero:

$(3) (3) - 3 = 0$. Lt. Frederick (USNR) Strong contributes this: $3 \times 3 \times 3 - 3^3 = 0$. The Lt. also sends in several based on the truth that zero divided by 3 equals zero. Sample: $\frac{33 - 33}{3} = 0$.

But mathematically we are hardshell Baptist, and won't accept 'em. You get a particularly fancy ribbon for your chest if you solve this one within ten minutes:

Find a six-digit square whose numbers represented by its first three digits and its last three digits are consecutive.



THIS COMPACT PACKAGE HOLDS ALL YOUR TOOLROOM *heat treating*

A COMPACT setup for the precision heat treatment of your finest tools and dies is this Lindberg preheat furnace, high speed furnace and tempering furnace with complete quenching equipment.

The Lindberg Cyclone Tempering Furnace is the most widely used tempering unit in the field today because of its principle of recirculated hot air from an isolated heat source, together with the precise control which gives perfect tempering to meet the specifications calling for the desired toughness to give maximum tool life.

The preheat and high speed hardening furnaces employ the Lindberg Hydrying process for hardening *all* tool steels. This saves the expense of costly cleaning operations such as sandblasting, polishing, stoning, etc. The neutral hydrying atmosphere protects all tool steel from scale, decarb and carburization with the consequent assurance of long productive tool life. Where desired, Lindberg can also supply pot furnaces and complete equipment to meet any quenching requirements.

You can have all the advantages of clean, full hardening and accurate, low-cost tempering. Write today for full information.

Typical of the tools hardened by the Hydrying method is this bell shaped cutter of Moly High Speed Steel. Measuring 5" on its outside diameter, it weighs 8 1/4 lbs.

It was preheated in a Lindberg Hydrying Furnace at 1500° F., for 48 minutes, then placed in the high speed furnace for 12 minutes at 2225° F. It was quenched from 2225° F., into an 800° F. lead bath to avoid cracking at the sharp recesses of the teeth. From the lead bath it was allowed to cool to 150°-180° F.

In a Cyclone Toolroom Tempering Furnace, the cutter was heated for 2 hours at 1025° F., removed and allowed to cool to room temperature. Hardness was 65-67 Rockwell "C".



LINDBERG ENGINEERING COMPANY
2452 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

Lindberg
FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering

CYCLONE for accurate, low-cost tempering and nitriding

HYDRYZING for scale-free and decarb-free hardening

Dear Editor:

POSTWAR SELLING

Sir:

Your Aug. 17 editorial, "Successful Postwar Selling," hits the nail on the head. Your thoughts are most timely, and we would like to have all our people who are interested in the sales of tomorrow have the benefit of these thoughts.

VERDIE A. DODDS,
Vice-President

Brown-Wales Co.,
493 C Street,
Boston 10

Sir:

"Successful Postwar Selling" is so direct, true and simple, that I would like to use it with some of my staff, and perchance, with a few selected customers.

So rarely does one find a ripe meaty kernel, all shelled, skinned and ready for consumption, that it should be passed around. Have I your permission to do so, giving due credit for the authorship?

HUGH MILLAR,
President

Lyman Tube & Supply Co., Ltd.,
Montreal

● Granted.—Ed.

PW ELECTRIC STEEL

Sir:

Can reprints be obtained of the article, "Postwar Prospects for Basic Electric Furnace Steel," by Frank T. Sisco in your July 27 issue? I would appreciate having about five to ten such reprints if available, as this article offered considerable information of interest.

G. M. MOGA,
Superintendent

National Carbon Co., Inc.,
Niagara Works,
Niagara Falls, N. Y.

● Reprints have not been made but several clippings are being sent you.—Ed.

NORTHWEST OPPORTUNITIES

Sir:

Your "West Coast" section of June 8 mentions an 84-page publication, "Pacific Northwest Opportunities." I am very much interested in that territory. How can I get a copy of the book?

CHARLES W. DAVIS

11675 1/2 Magnolia Blvd.,
N. Hollywood, Calif.

● Write to the Bonneville Power Administration, Portland, Ore.—Ed.

ARITHMETIC AND POLITICS

Sir:

Your Aug. 10 editorial, "Arithmetic and Politics," was so excellent I am writing to inquire if a couple of loose sheets are available, so that they may be passed about and spread in newspapers where more can learn these truths.

Your editorials are always fine but the latter is a winner.

CHARLES T. YOUNG

Box 419,
Passaic, N. J.

SAND RECLAIMING

Sir:

Your July 6 issue has a very interesting article on "Reclaiming of Foundry Sand by the Wet Method," by William Rengering, asst. foundry supt., and Walter Horth, foundry plant engineer of the Cincinnati Milling Machine Co. Can we get a reprint?

Z. T. CRITTENDEN,
Chief Metallurgist

Pontiac Motor Division,
General Motors Corp.,
Pontiac, Mich.

● No reprints were made but we are sending you a clipping.—Ed.

FLUID DRIVE HEAT RISE

Sir:

I am interested in data on heat generation of fluid pumps; fluid drives or fluid friction brakes. My chief interest is in the question of heat generated within the fluid as a result of increase in back pressure on the pump.

L. W. STORM,
Chief Engineer

Houston Oil Field Material Co., Inc.,
P. O. Drawer 2589,
Houston 1, Texas

● We recommend the book, "Thermodynamics, Fluid Flow and Heat Transmission," by H. D. Croft, McGraw Hill Book Co., 330 West 42nd St., New York, price \$3.50.—Ed.

METAL POWDER

Sir:

We were particularly interested in the reference in your June 15 issue to the paper entitled "Presses and Processes for Metal Powder Products" by E. V. Crane and A. G. Bureau. The writer wishes to obtain two copies of this paper to forward to his principals at Coventry.

R. A. SMITH,
Representative

Alfred Herbert Ltd.,
Coventry, England

● Two sets of clippings of this article which appeared in our June 29 and July 6 issues are being sent. Reprints are available from the E. W. Bliss Co., 52nd St. and Second Ave., Brooklyn, with whom the authors are connected.—Ed.

TOOL STEEL DIRECTORY

Sir:

A copy of THE IRON AGE Directory of Tool Steels would be very much appreciated.

WILLIAM H. SNAIR, Capt.,
Ordnance Dept.

Springfield Armory,
Springfield 1, Mass.

Sir:

We have received the Tool Steel Directory and find it satisfactory. We would appreciate it if you would send us five more.

ANDREW SAFKO

Standard Steel Treating Co.,
3467 Lovett Ave.,
Detroit 10, Mich.

● Price is \$1 for single copies, less for quantities.—Ed.

SQUARE FRYING PANS

Sir:

Your Aug. 17 editorial expresses a desire for a rectangular frying pan to fit bacon. They are to be had and they are most undesirable. Your burners on electric, gas or even old-fashioned coal stoves are circular. A rectangular pan overlaps on the corners, resulting in an uneven distribution of heat—either a concentration and a hot spot or up to four cold-spots.

C. C. FINN

John Finn Metal Works,
106 W. McGraw St.,
Seattle 99

Sir:

Rectangular frying pans existed before the war, being made of aluminum with lower, more conveniently flared, side walls.

They fit slices of bacon much better than round ones, as you know. They also fit and accommodate more French toast or more round pancakes for that matter.

Round frying pans have persisted because the burners or units are round and the old iron frying pan was a relatively poor conductor. A reasonably heavy aluminum or copper rectangular pan will conduct the heat rapidly to the corners, thus making this type quite practical in use with round heating units.

If you are interested in eating bacon, forget all about frying pans and try slow broiling in an electric range on the rectangular broiler pan. If you do try it, just the thought of broiled bacon is apt to make you drool.

G. L. REES,
Special Development Engineering
General Electric Appliance Co., Inc.,
5600 West Taylor St.,
Chicago

FREE ROUTING SLIPS

Sir:

We are much obliged for the routing slips and are glad to say that we have already found them to be most helpful.

R. B. CURTIS,
Director

Metal Pressings, Ltd.,
Old Dockyard, Woolwich,
London, S.E., 18

● Plant subscribers may obtain routing forms, specially printed with the firm name and the names of readers, at no charge. Mail the list of readers to The Iron Age, 100 E. 42nd St., New York 17.—Ed.

NON-FERROUS BLANKING DIES

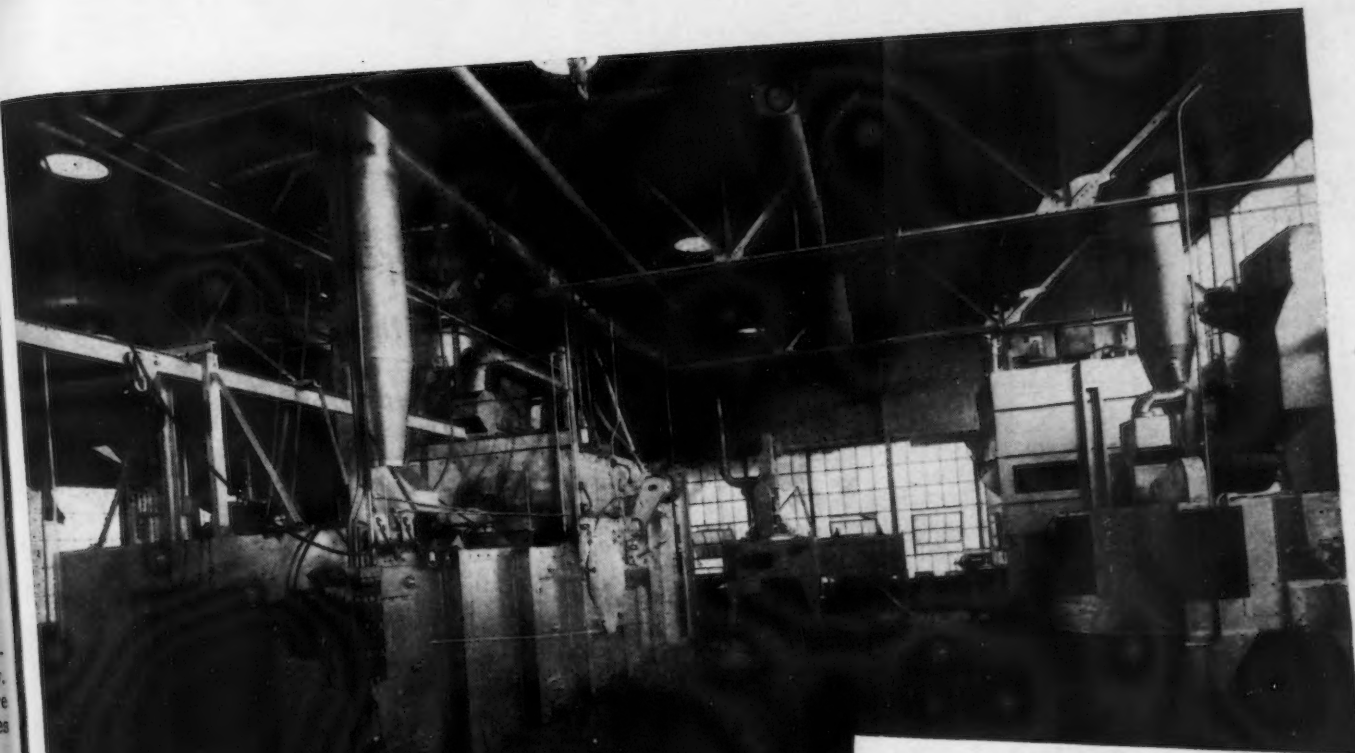
Sir:

We read your article, "Non-Ferrous Alloy Blanking Dies" in the Aug. 17 issue, with great interest, especially that part on page 76 referring to Bistic-B. Where can we get more information regarding this product?

F. X. KINDBERG

Letz Mfg. Co.,
Crown Point, Ind.

● Bistic-B is a newly developed alloy sold by National Alloys, Ltd., Div. of Imperial Smelting Corp., Ltd., 95 Gresham St., London E.C. 2.—Ed.



OUR AIRLESS WHEELABRATOR LABORATORY
(PARTIAL VIEW)

YOUR PROVING GROUND FOR BLAST CLEANING PROBLEMS

A *NATURAL MECCA* for friends and customers seeking the solution to metal cleaning and finishing problems is the "American" testing laboratory. Hundreds upon hundreds of studies are conducted there each year.

Built and equipped at a cost of nearly a quarter of a million dollars, this is the largest and most complete department of its kind in the blast cleaning industry.

Our storehouse of experience is based upon intimate contact with thousands of commercial blast cleaning applications. It is your assurance of competent assistance in working out the practical answer to your problem.

Whatever that problem may be—whether large or small—come to American for recommendations. Our entire facilities are at your disposal and we invite you to make use of them. We want you to feel that doing so implies no obligation on your part.

You Name the Cleaning Job—We'll Show You How to Wheelabrate it Faster and Cheaper



AMERICAN
FOUNDRY EQUIPMENT CO.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

All These Facilities Available for Job-Tested Cleaning

Wheelabrator Special Cabinet equipped with 4 Wheelabrator units and various work handling systems for cleaning practically any commercial product.

Wheelabrator Tumbblasts

Wheelabrator Tablasts

Wheelapeening (shot peening) Machines

Airblast Room and Cabinets

Metal Washing, Rinsing, and Drying Machines

510 SOUTH BYRKIT STREET
MISHAWAKA, INDIANA

This Industrial Week . . .

- **Steel Tonnage Heavy but Orders Decline**
- **Increased Costs to Come with Reconversion**
- **Supply of Steel Ingots Outruns Demand**

ALTHOUGH steel mills this past week noted little change in the volume of steel bookings from a tonnage standpoint there were additional signs that the actual number of orders appeared to be on the decline. This condition was being viewed in some quarters as further evidence that extreme caution would be exercised by steel buyers until such time as clarification is forthcoming on the probable end of the European war.

Orders responsible for the heavy steel tonnage in the past week involve war orders such as Navy flat rolled requirements, landing mat needs, and such items as structural requirements for the Army and Navy bridge programs. Another factor which has swelled tonnage volume was railroad requirements for rails and track accessories.

There was additional evidence in the past week that Maritime plate needs will be down considerably in the first quarter of 1945. According to steel reports the anticipated cut in Maritime plate requirements is being viewed as more of a certainty this time than has been the case in the past. When and if this substantial reduction in plate rollings materializes, it will be a signal for a rapid clean-up on hot rolled sheet tonnage, which has been piling up on mill order books.

With the probability of an increase in the volume of civilian buying by the first quarter of next year comes a question which is now uppermost in some steel men's minds—higher steel manufacturing costs. A substantial number of war orders, especially in the flat rolled category, have been so heavy and so uniform in size that a re-establishment of regular civilian flat rolled orders will find an increase in handling and manufacturing costs. This is bound to be true because the normal pattern of civilian ordering usually involves a great number of individual orders, some of which are quite small in total tonnage compared to bookings received during the war period. Change of rolls, more exacting requirements and additional finishing handling will all combine to increase the unit cost of steelmaking at a time when many plants are already close to the "break even" point.

THIS line of thought involving probable higher steel costs has naturally led to speculation as to the possible outcome of the War Labor Board's forthcoming decision on steel wages. Some observers in the industry believe that if labor is granted a raise the OPA will likewise allow an upward price revision on those steel products which have shown the least return. Briefs from steel companies on the

necessity for higher prices were filed some time ago, and if the OPA favors an upward adjustment of steel prices, it is not believed that the action will necessitate a long period of deliberation.

Postwar plans for many firms, notably those in the automotive group now have advanced to the point where these companies are able to place tentative production plans in the hands of steel suppliers. Some automotive firms, it appears, will be able to supply a trickle of cars well in advance of the 90 days often quoted as the necessary reconversion period. It seems clearer than ever this week that while war production was at a high point, steel production at high levels and steel backlogs changed but little, more and more thought was being placed upon the practical aspects of reconverting to civilian manufacture. Additional reports were available this week indicating steel consumers had taken an even tighter rein over inventories.

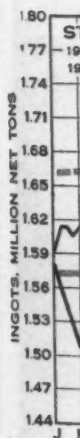
On the steel market front this week, it was noted that steel ingots were going begging. A few months ago steel ingots were in heavy demand and were being processed by companies whose finishing facilities were adequate to meet this need. Recently, however, a drop in lend-lease requirements and manpower shortages at plants which heretofore were able to process ingots from other sources finds the supply outrunning the actual demand.

THE scrap market this week showed further apathy with little or no changes in the prices of major grades. Actual sales were at a minimum as consumers continue to watch their inventories some of which are said to be substantial in view of the war news. Due to lower prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia, THE IRON AGE scrap composite price has declined 34c. per gross ton to \$18.83. Prior to the decline in market quotations the composite had been at \$19.17 per gross ton.

The nation's steel operating rate has declined half a point this week to 96.0 per cent of rated capacity. Chicago output is up one and a half points to 100.5 per cent and at Wheeling, operations have gained one point to 91 per cent. Other district gains are Detroit, up five to 99 per cent and Cincinnati, up one to 99. Declines have occurred in four steel-making centers: Youngstown, down three and a half to 96; Cleveland, down two to 94.5; Buffalo, down two to 104.5, and the Eastern district, down 21 points to 73.5 per cent. Pittsburgh at 93; Philadelphia at 98.5; Birmingham at 99, and St. Louis at 106 continue at last week's levels.

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Week of
August 29,
September

* Revised

• **OIL COUNTRY TUBULAR GOODS**—While oil companies are buying casing 4 to 7 months ahead, the easing of the present critical steel situation will probably mean that closer buying can be expected. This is especially true if mill stocks can be setup at various consuming points. Drill pipe is now selling for April delivery, while tool joint deliveries are frequently as much as 10 or 11 months in the future. Since 1941 oil well drilling has not been up to normal, and it is expected that as soon as equipment becomes readily available some of this "less than normal" drilling will be recovered. While many new oil fields have opened up in the past two years, operations of old fields under the stress of war needs have been excessive. These fields also offer markets for oil country tubular products. Oil companies during the war have depleted their stocks of materials considerably, and as soon as conditions warrant these will be replenished. Fourth quarter oil country goods demand is expected to be heavy, but if the European war has not ended by that time considerable competition with aerial bombs will exist.

• **NOT GAMBLING**—Some reports circulating in the trade to the effect that scrap consumers are "taking a gamble" by refusing to buy additional scrap at this time, as well as reports that "someone is trying to break the market" indicates a lack of knowledge of how scrap markets operate during normal times. Events during the past few weeks in the scrap market are somewhat similar to those which have repeatedly taken place in the past before controls or ceilings were established. Recent reports from the field indicate that stocks of scrap at some plants are somewhat larger than is generally known. Actual statistics on scrap supplies and scrap inventories have never been current and, furthermore, so called "grand totals" obscure the fact that there are geographical differences as to the actual day's supply on hand. The tendency of some steel scrap consumers to refuse to buy at this time can only be that after proper investigation they find their stocks to be adequate, or what they consider to be a conservative production forecast. The lack of orders has caused brokers and dealers to react in the same manner as they did in normal times—seek new business at lower prices. The big "if" in the present normal workings of the scrap market would be the failure of the defeat of Germany to come within the next few months or so. Even if this did not happen, there does not appear to be a chance of a real scrap shortage, even though demand may become stronger and prices may snap back to ceiling levels. Day's supply of scrap on hand is a flexible measurement which over-night can

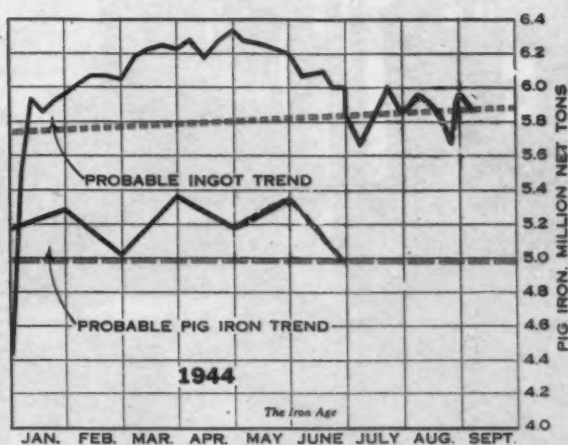
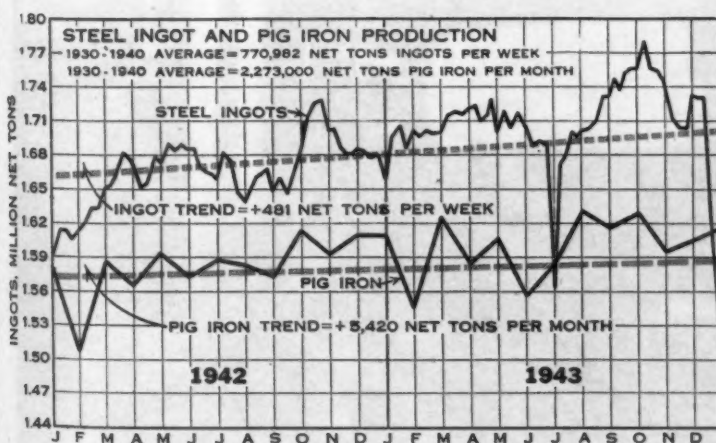
change upward or downward with surprising speed, depending on the ascent or descent in steel operations—a fact very well known by scrap buyers and sellers.

• **REFRACTORY MATERIALS**—With one major producer of refractory materials said to be currently hunting business, indications are that a fairly sharp decline in refractory requirements by the steel industry has materialized recently. The present lull in business, however, is not too unexpected when it is recalled that refractory producers expanded their capacity while the steel industry was increasing its capacity. With steel expansion programs completed, or curtailed, refractory sales are back on a "replacement" basis rather on a "new-installation" basis.

• **PERSONAL MAGNETISM**—It is being said in Cleveland that the personal magnetism and excellent employee relations of Fred C. Crawford, president, Thompson Products Inc., and Thompson Air Craft Products, was the prime reason why employees at those plants, recently, shut out both the CIO and the AFL by a vote of 2-1 in a recent NLRB election. Meanwhile, the CIO has charged "coercion" on the part of Mr. Crawford, who recently in an unprecedented method (at least since the Wagner Act passage) undertook to speak before a mass meeting of his employees and to distribute literature in answer to union literature, on the eve of the election. The CIO has been attempting to organize the Thompson employees for about seven years.

• **NOT A LOCKOUT**—At Cleveland, recently, 5000 men at the Cleveland Graphite Bronze Co., makers of vitally needed air craft bearings, were on strike because an employee was fired for breaking a 75-cent lock on his locker when he lost his key. Meanwhile, like other strikes of this type, critical war production was held up.

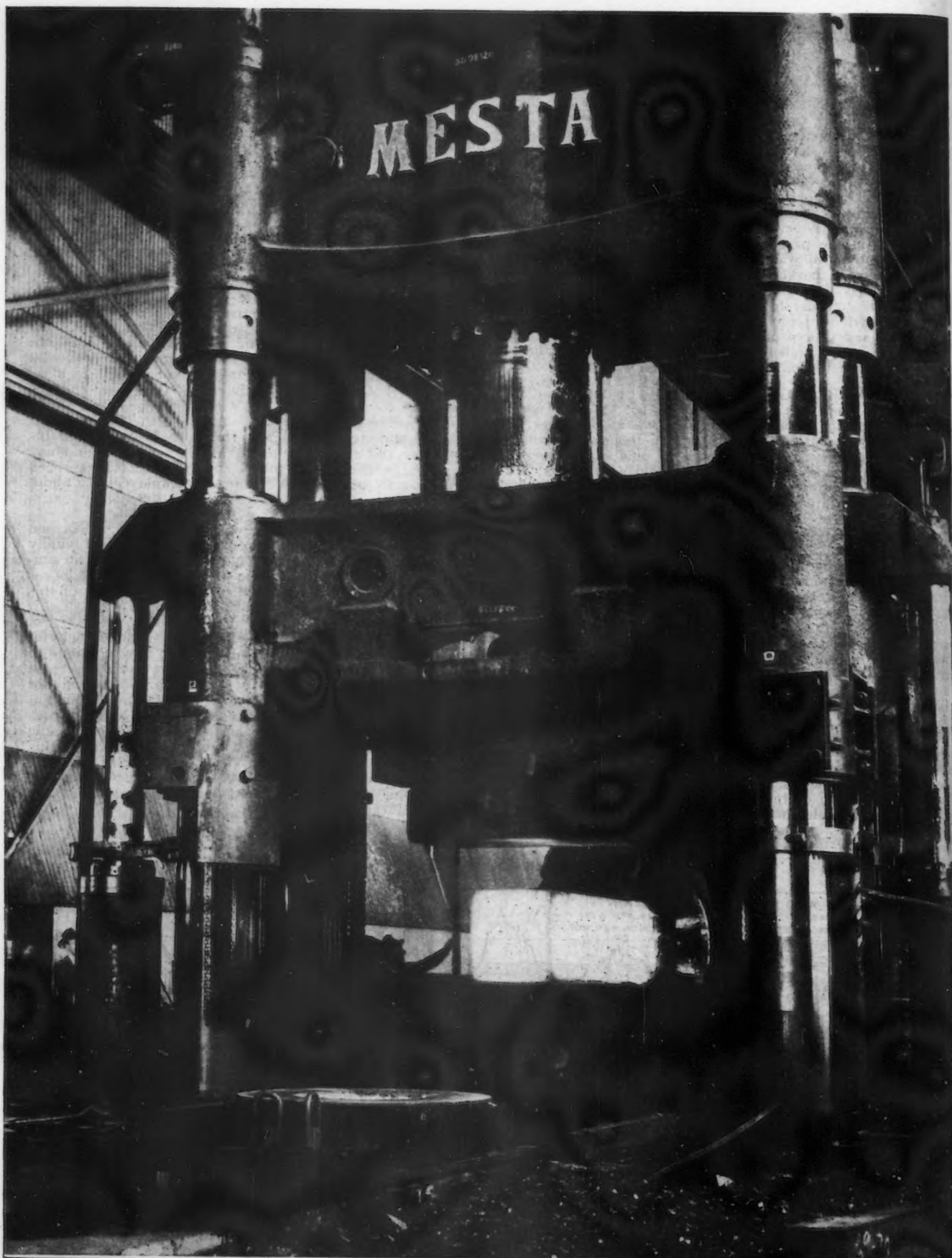
• **SURPLUS MATERIALS**—Although surplus stocks of steel have been growing in total tonnage, they continue to be overwhelmingly dominated by narrow strip in most parts of the country. Merchant bars in a wide variety of shapes and sizes run a poor second, but the more common analyses of plates and sheets so vitally needed by most consumers at this time are noticeable by their absence. If the strip offered for sale in the past few months from surplus stock is any criterion of what may be expected in other products, the industry need have little fear of competition from surplus products for most material offered is of unusual specifications.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 29.....	93.0	99.0	99.5	99.5	96.5	106.5	90.0	99.0	94.0	83.5	98.0	106.0	94.5	96.5
September 5....	93.0	100.5	96.0	98.5*	94.5	104.5	91.0	99.0	99.0	88.5*	99.0	106.0	73.5	96.0

* Revised



The Army-Navy "E" Flag
with four stars, flies
over the Mesta plant

Forging Breech Housing on a Mesta 5,000 Ton Hydraulic Forging Press

MESTA MACHINE COMPANY, Pittsburgh, Pa.

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The Steel Outlook for the Postwar Period

••• Reticent and at times backward tendencies exhibited by the steel industry in the past are not those characteristics that will come forth when this important factor in the nation's economy reconverts to normal production. For months and in some cases for more than a year companies have been making their plans to see that steel outlets are not only regained but are also expanded.

Plans are one thing, action is another. Today no steel official regardless of his high powered research of markets and his streamlined methods for dealing with competition in his own field and others has the slightest idea of what is just ahead. Whether there will be extended controls from Washington is not known. How much cut-backs will actually whittle away a backlog that is now becoming fictitious is known by no one in or out of the industry.

Yet there is this week a feeling that the end is near and soon the situation must be faced. It is for these reasons that steel companies and their customers are becoming over cautious about such things as inventories, expenditures, steel making methods, new purchases and a host of other things. One thing is certain—if the industry is to bridge the gap between a temporary setback and the lush days to come at some future date, the plans that have been worked up with sweat and a painstaking analysis of past experience must be in such shape that they can be executed on a moment's notice.

A check of many companies shows that they are ready to act when and if they

get the go ahead signal either before or shortly after Germany folds up. The tremendous drop in orders, the cancellations of orders and the melting of backlogs has been discounted by the more realistic steel men. What they are now pondering is how to get those order books filled with firm commitments which will keep the mills going, keep labor which is needed, pay the bankers and at the same time sell steel at a profit.

While most steel companies would like to believe that their postwar plans are secret and are of the type that will outwit their competitors, most of them follow the same general lines. Old markets have been analyzed to see how much steel company "A" bought, how much it should have bought and how much it may buy in the postwar period. Complaints have been gone over, salesmen have been questioned hour after hour, other sources of the customer have been scrutinized to see how they fared, consumer officials have been diligently wined and dined and finally the question "why don't we sell more to them" has been argued until there are no more answers. The sum total of this part of their plans is

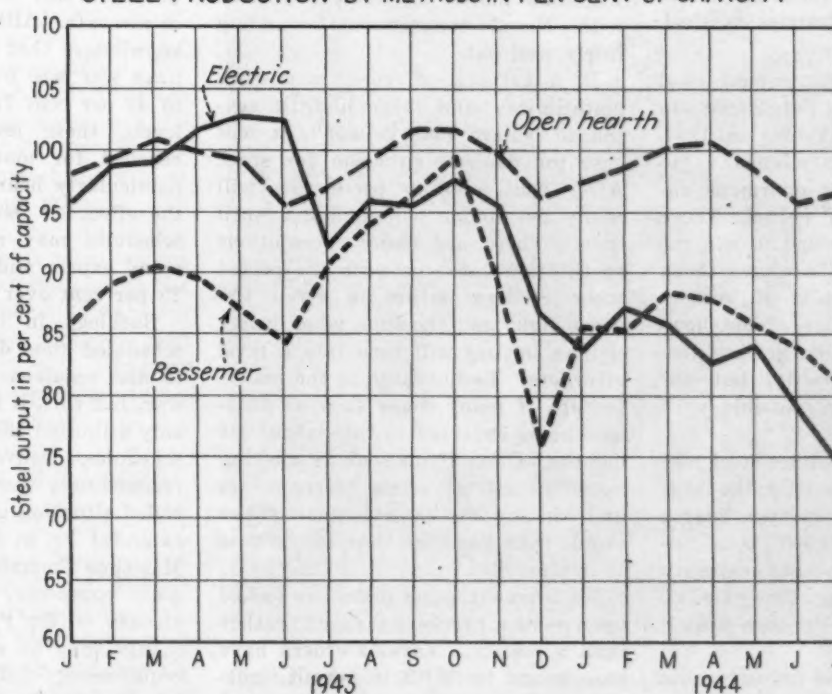
"get our share or more if possible."

New fields have been explored to see where steel fits in and how much tonnage is likely. Here again most steel companies with closely guarded actions have really been following the same path. As to who will do the best job of scouring new markets will be told in the financial returns after the fight is on. Certainly this active and aggressive attitude on the part of an industry which many times in the past has passed on its blood and sinew to its consumers to its own detriment bodes at least an attempt to make the steel industry not only the largest (which it has always been) but also perhaps to confound its critics in its ability to stay with the economic trends of the nation.

While the steel industry's consumers will always have a certain influence upon what is produced and what new products or fields are tapped it seems certain that the industry in the next peacetime period will blossom forth with ideas which well may stagger those who thought "the old fellow was on his last legs." Yet astute "kibitzers" are already saying that the automobile industry will still dictate prices and grades,

which dictation serves to help out, from a cost standpoint, every other consumer. There are also signs that the railroads, which in the past have put it on the line, may have different ideas since their competition with airlines means life or death to their now heavy and greatly desired passenger trade. Also the war trends of making some things do, that otherwise would not have been used, have caused some widespread speculation among steel consumers as to the ade-

STEEL PRODUCTION BY METHODS IN PER CENT OF CAPACITY



Source: Amer. Iron and Steel Inst.

quacy of certain steel extra charges.

No one in the steel industry today is kidding himself that steel prices will not have the most important effect upon future steel markets. Long and grandiose arguments may be held about quality; slogans may be coined and propaganda may be dished out, but the price paid by the consumer is the ultimate deciding angle. This, in the past, has led to price wars which in many cases have caused a transference of some of the industry's life blood to its customers. That fact alone has been responsible for the saying that the industry has been the best producer but the poorest merchandizer of goods the country has seen.

But there is one check on this situation which steelmen see in their dreams and in their clubs—high steel wages backed by one of the strongest unions in the country. It was born in 1936, given a short life by the diehards but is here to stay, on authority of some of the industry's top-most industrial relations managers. And just to make matters reflect more resistance to reckless price cutting steel customers have had their taste of labor rates and there is no more chance of them getting rid of them than there is for the steel industry to do so, hence the vicious spiral of lower prices at the expense of labor is ruled out in this postwar period. That leaves competition, new methods, short cuts, mass production, new blood, better markets, greater markets and what have you to cause their influence to be felt in such basic industries as steel.

* * *

PITTSBURGH—With annual steel capacity rising from 81,828,958 in 1939 to 93,652,290 net tons in 1944, steel producers are concerned as to the utilization of this enormous capacity in the postwar period. There is no doubt it was needed to win the war since steel mills have been stretched to their limits of production on several occasions. Now, however, emphasis is not on getting production close to capacity, but obtaining all production possible with available manpower.

Although electric furnace steel rose the greatest percentage-wise, the largest total increase was in open hearth capacity. The 3,500,000 tons increase in electric furnace capacity was overshadowed by the gain of nearly 10,000,000 tons in open hearth capacity.

Thoughts in the steel industry now center on the probable steel market

immediately after the European war ends. There is little doubt that the European theater of action has consumed the bulk of war production. With the close of hostilities in Europe, some observers think that steel cancellations will come close to 75 per cent of the present incoming order volume and that backlogs will be reduced quite substantially. Other

• • • While the steel industry's consumers will always have a certain influence upon what is produced and what new products or fields are tapped, it seems certain that the industry in the next peacetime period will blossom forth with ideas which well may stagger those who thought "The old fellow was on his last legs" . . . Yet some astute "kibitzers" are already saying that the automobile industry will still dictate steel prices and grades. . . . No one in the steel industry today is kidding himself that steel prices will not have the most important effect upon future steel markets. . . . Long and grandiose arguments may be held about quality; slogans may be coined and propaganda may be dished out; but the price paid by the consumer is the ultimate deciding angle. This in the past has led to price wars which in many cases have caused a transference of some of the industry's life blood to its customers.

opinion, however, does not put the figure this high. These cancellations will come mostly on Army contracts, with Naval commitments standing fairly well pat.

If a cutback of such magnitude materializes, and there is little reason to believe that it won't, it will ease the demand situation for steel. After that, civilian production will really get under way and not until then. There are many speculations on the time lapse between the period when civilian output is given the green light and the time when heavy civilian buying will turn into a flood of orders. Reconversion to the manufacture of many items such as automobiles is expected to take about six months. Other items such as washing machines, electric irons, refrigerators and similar mechanical commodities should take less time than in the case of automobiles.

WPB reconversion plans are looked upon as of a procedural nature rather than a reality. Various orders have been issued by WPB to permit limited reconversion on various capital

goods and consumer items but there has been little or no such reconversion.

On the question of what will happen to steel capacity, it is believed that small, high-cost, non-integrated operators will have tough sledding. Non-efficient companies will find it difficult to meet the competition of those which have written off obsolete equipment and streamlined their production and sales procedures. There is little doubt that 10 per cent or more of the present steel capacity will be written off after the war with Japan ends as being too obsolete and too high cost to keep in operation.

To say that electric furnace steel has gained ground because of the war is no exaggeration. However, it will still remain in the specialty steel class and it is unlikely for some years to come to be a bulk producer of steel. There are many in the industry who will argue this point, but the comparison on tons per heat production in the electric furnace with that of the open hearth seems to bear out the former opinion. Utility costs also are said to be a factor in the probable future of large scale electric steel output. One thing seems certain, however, and that is electric steel production in the postwar era in percentage of total steel produced will be definitely higher than its relative position prior to 1940.

* * *

CHICAGO—In evaluating the effects of a sudden armistice it should not be forgotten that such a possibility has been discounted to some extent in production schedules, particularly in aircraft. Although it has been acknowledged that the end of the European war will mean a cutback of 30 to 40 per cent from peak production levels, these levels have not been reached for many individual items, particularly heavy ordnance. Hence, the effect on immediate steel rolling schedules may not be as great as many expect and possibly only 20 to 25 per cent over all in steel tonnage.

Backlogs in the form of future scheduled steel deliveries will be cut to meet requirements for the Japanese war, but this, it is believed, will have only a limited effect on the immediate schedules. Deliveries will become correspondingly imminent, but the flat rolled situation is expected to remain extended by at least 60 days. The Maritime Commission, which is the big plate consumer, is basing its plans already on the Pacific war, and little change may be expected in its plate requirements before the slight drop scheduled for December and the sharp

drop projected for the first quarter of 1945.

Nevertheless, Maritime and Navy advance schedules may be sharply cut. Principal sheet consuming programs are also said to be mated with the Pacific war and for this reason the end of European hostilities will probably find sheets in the most extended position among the various steel items.

Leading automobile firms have told Detroit steel officers that they will have steel orders for initial automobile runs placed within four days to one week after permission is given. Other big consumers such as heavy appliance manufacturers have not indicated such strong interest. Although district offices which have nearly all been actively soliciting initial orders report little resistance, farm equipment makers who have been given a free hand relatively, have long since placed steel requirements through June, 1945.

It is believed that new flat rolled tonnage placed now, even should Hitler immediately surrender, would not secure delivery before January. When Germany is defeated, the steel operating rate undoubtedly will sharply and arbitrarily rest for a day or two until the order situation clarifies. However, on standard carbon grades, steel producers will probably bank ingots rather than shut down furnaces if labor stays on the job in sufficient numbers. Actual rolling of steel into finished products may come to a complete halt until reassurance is given item by item.

The ingot rate, however, will probably soon climb again immediately after the war to reflect a clarified situation after cutbacks have been digested—probably to at least 75 per cent of capacity. Product mix at that time will be the big difficulty and finishing facilities the bottleneck. Electric steel already can be had for early delivery and at the end of the European war the operating rate for this type of steel will probably drop off about 20 per cent with bessemer soon returning to its prewar status.

Steel Company Profits Drop To New Low for First Half of 1944

New York

••• The total amount of money earned by the steel industry in the first half of 1944, declined still further from peacetime levels and was at a rate of return of less than 4.5 per cent of investment, it is indicated in a report released Aug. 31 by the American Iron and Steel Institute.

After meeting all charges but before payments to stockholders, a group of companies representing more than 90 per cent of the industry's capacity showed aggregate net earnings of \$86,099,000 in the first six months of 1944.

Those wartime earnings were 9 per cent below the total of \$94,522,000 earned in the corresponding period of 1943 and were little more than half of the total of \$159,054,000 earned in the first half of 1937 when production of steel was almost 30 per cent below what it is this year.

The rate of return on investment during the first six months of this year, less than 4.5 per cent, compares with 4.9 per cent in the corresponding 1943 period and with 8.3 per cent in the first six months of 1937.

Although net earnings were down substantially, total payrolls of the in-

dustry, including those of certain subsidiary companies which do not produce iron and steel, rose to new peaks. During the first half of this year, more than \$1,318,264,000 were paid out to employees of the industry, compared with payrolls of \$1,236,485,000 in the first half of 1943 and with \$580,643,000 in 1937.

Reflecting the decline in net earnings of the industry, dividend payments to stockholders dropped in the first half of 1944 to \$68,556,000 as against \$69,372,000 in the corresponding 1943 months and \$72,813,000 in the first half of 1937.

The reduced profits likewise brought a decline in the amount of federal income and profits taxes as compared with the corresponding 1943 period. A total of \$253,138,000 in such taxes was paid in the first half of last year, but in the same period of this year such taxes amounted to only \$185,807,000.

In consequence, total tax payments of the industry in the first six months of this year were below the corresponding period a year ago, amounting to \$266,002,000 as against \$335,178,000 a year ago. In the first half of 1937 total tax payments of all kinds aggregated only \$86,439,000.

WPB Order M-21-H Revoked

Washington

••• WPB reported on Tuesday that supplementary order M 21 H has been revoked. Requirements for tool steel have decreased WPB said, to a point where the controls and reports that M 21 called for no longer are necessary.



READY FOR ACTION: Air Force mechanics ease a smoke tank into its cradle in the plane wing at the Army Air Force Tactical Center, Orlando, Fla. This scene is being duplicated in combat theaters all over the world.

Say Comfortable Inventories Are Behind Latest Scrap Movement

Pittsburgh

••• With scrap buying at probably its lowest point since before the start of the war, the feeling that a price break is imminent persists in all quarters. However, steel producers so far have avoided forcing a price break, which they could easily do, on the top grades of scrap, and aside from refusing to pay the freight differentials in this area, have been content to let the matter stand. The scrap business has moved recently from a sellers' market to a buyers' market. The greatest likelihood, however, seems to be that a price break in the scrap market will coincide with victory in Europe.

Buyers are now in an excellent position on scrap, with inventories running even heavier than they care to admit. With this assurance of sufficient supplies of scrap, they are now attempting to work off excess quantities of scrap and upgrade the stocks that they are willing to hold. This is being done by most of the heavy scrap consumers all over the country.

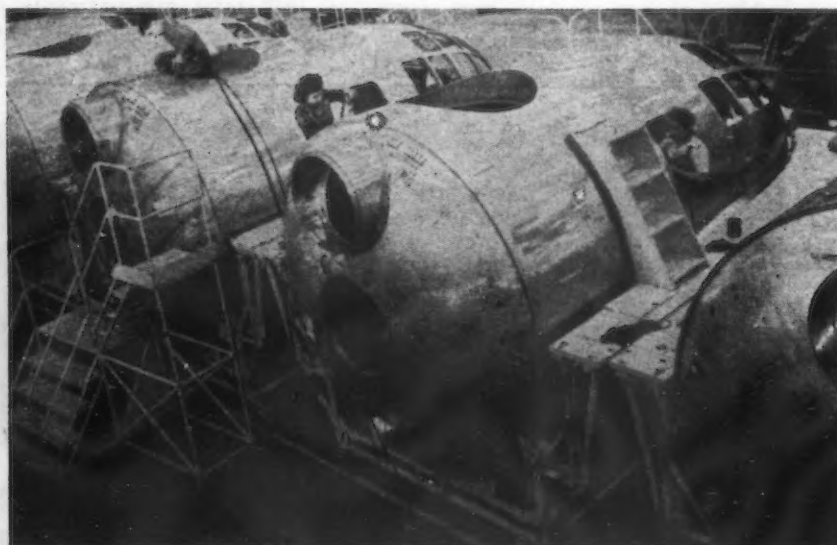
Another feature along these lines is the attitude of one mill toward its scrap inventory. This mill, while it has considerable good mill scrap to sell, is holding out for top prices, feeling that good scrap in its scrap yard now and in the future is far better than taxable money in the bank. Another mill is refusing allocations on the grounds that it is generating more scrap now than it can sell.

Price adjustments on off-grade shipments of scrap to mills are also coming under close scrutiny. One of the largest consumers in the district has point blank refused to make any price adjustments on under-grade shipments and is refusing the entire shipment. This again points to the attempt to buy only the best scrap for stocking.

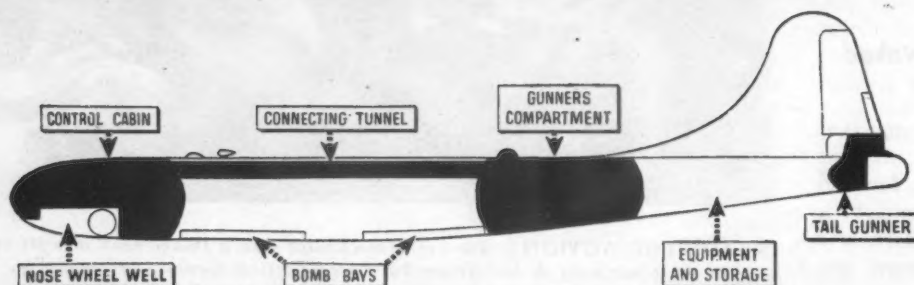
Already, there are evidences of the re-appearance in the scrap market of standard differentials in scrap grading. These differentials were eliminated when the OPA ceiling pricing system was inaugurated. Working under OPA for the past three and a half years, both sellers and consumers

have almost forgotten that under normal conditions very specific price differentials exist among the various grades. Also, the addition of new and supplemental grades of scrap by OPA has further complicated the situation. With the softening of prices through the increased supplies of scrap, even the artificial stimulation given scrap by the war demands and frequently by controlling agencies in Washington may not be enough to prevent the re-appearance of grade differentials. In fact, these price differentials have already begun to appear on the West Coast, according to some observers.

The lack of interest in the scrap market by consumers has given the mills an excellent chance to clean house. While they are reducing the quantity of scrap in inventories and up grading its quality, they are also getting rid of considerable amounts of such items as skulls, broken ingot molds, runners, and buttons. They are charging directly from incoming cars, and thus freeing cranes and other equipment to aid in the house cleaning. On the whole, much work that is taken care of in normal routine but that has been neglected because of the press for greater steel production, is now being done during the breather.



PRESSURIZED NOSE: At left, workers put the finishing touches on pressurized noses soon to go into the famous Boeing B-29 Superfortresses. The pressurized sections of the B-29 are built like little stratochambers. The ship's fuselage is round for the same reason a dirigible is cylindrical, to distribute the inside pressure evenly over the wall. At left, (below), this cross-section of a Superfortress is drawn showing the pressurized sections in black. White areas are unpressurized. The cabin and nose section are connected by a personnel tunnel across the two bomb bays.



See Need for Single Agency To Coordinate Reconversion Controls

Washington

• • • Certain controls over production will have to be lifted as soon as possible, but there is need for an overall agency to coordinate reconversion tax, cutback, price policies, and relaxation of manpower controls, a high administration official said on Sept. 1.

"The failure to ration certain critical components will result in unemployment for 4,000,000 men," an official who declined to be quoted predicted.

"Do you think that the working men of the country would put up with such a situation or that the return-

ing servicemen would not do something about it?" he questioned.

WPB controls are relatively unimportant when compared to the questions of taxes, prices and manpower, it was said. These important phases of reconversion have no business being handled by a number of separate agencies, the official declared.

Moreover, he said, cutbacks will have to be handled by a civilian agency which cares more for the economy of the country than the trifling concerns of a particular department.

All this points to a need for legislation such as that proposed last Sep-

tember by Senator Walter George (Democrat of Georgia) in which it was proposed that civilian demobilization agencies be created.

Meanwhile, United Nations' solidarity took an upswing this week with the departure of Maurice Copeland, WPB Statistical Division official, to London to enter into discussions on the synchronization of reconversion in the two countries.

While it is being denied that the purpose of the trip is synchronization, it is understood that the WPB mission will include two Combined Production Resources Board officials as well as officials of FEA.

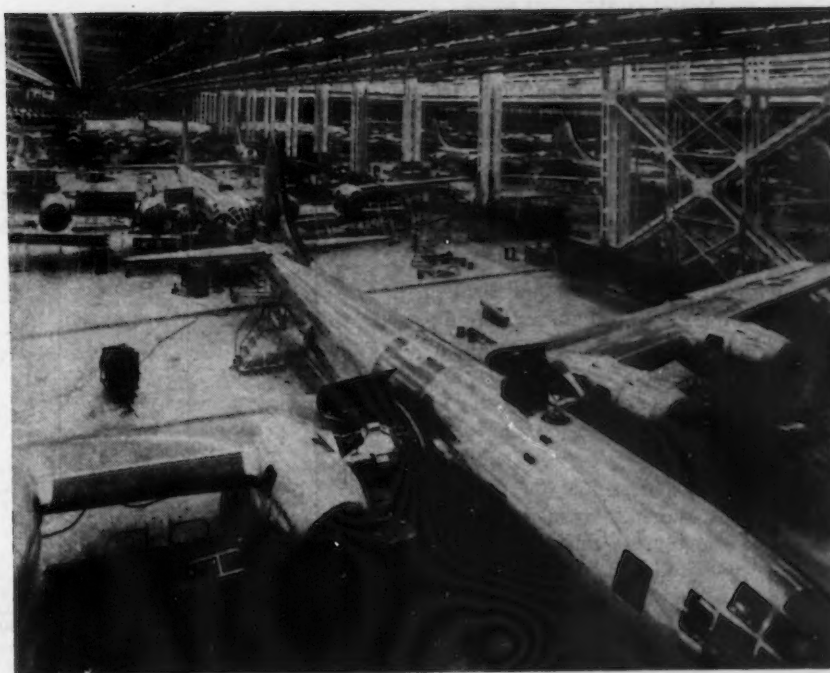
The mission will also look into the possibility of reducing lend-lease aid to England in the form of weapons and substituting therefore assistance for sustaining the civilian population, usually reliable sources say.



• • •

THE JAP NEMESIS: Boeing B-29 Superfortresses (above) move two abreast through three 300-ft. wide final assembly bays at the big Boeing-Renton plant. Engineers employed regular bridge construction principles in the design and erection of this steel work. At right, in the Boeing-Wichita plant, a clearance of 45 ft. has been allowed below the trusses for the handling of huge sub-assemblies and partially completed planes which are moved with the aid of wide-span monorail bridge cranes.

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Nelson Contradicts Recent Army Reports on Production Lags

Washington

• • • WPB Chairman Donald M. Nelson "blew-his-top" before he left for China by contradicting nearly every recent Army report made of production lags.

Mr. Nelson criticized the War Department and the War Manpower Commission, and explained that most of the shortages were because of recently increased military requirements.

The War Department he criticized because it has "too much of too much" but not because it has surpluses which were piled up for "contingencies which did not happen. He criticized War Mobilizer Byrnes for not spotting the surpluses and seeing to it that inventories of all military supplies were kept at home and abroad.

This was partly revealed two weeks ago when the Mead (Senate) Committee made public Mr. Nelson's testimony on the status of war production and the reconversion picture before the Committee on Aug. 16.

Undersecretary of War Robert P. Patterson and Army Service Forces Director Lieut. General Somervell have asserted that because of the manpower shortage production has lagged in such programs as heavy trucks, tires, bombs, heavy artillery and ammunition.

Mr. Nelson said that manpower shortages have held up most of these programs, but that this will be remedied by the cutback in aircraft which by December will free 300,000 workers. He told the committee that Gen. Somervell had known about the aircraft cutback three months before it happened.

The WPB chief placed the 1944 shortage in the munitions industries at 100,000 workers, and said there was a need for an additional 100,000 in sustaining civilian industry. He declared that there are 1,000,000 unemployed (BLS estimates 1,000,000), and that 1,000,000 workers have been lost to munitions industries in the past year.

Mr. Nelson's criticism of the War Department and Mr. Byrnes with respect to surpluses and inventories largely consisted in asserting that we should not have too great surpluses and should have adequate inventory knowledge, but that these matters are

the concern of the War Department and of Mr. Byrnes.

Highlights of Mr. Nelson's testimony follow:

"We talk of the radar program as being behind. The lag occurs mainly in new and improved sets which are constantly being changed by the O. S. R. D. It is a new art, and as soon as the new models are ready, they go on the production line, and I think we have production enough to get them out."

Speaking of the manpower in the foundries which has held up heavy truck production, Mr. Nelson said, "If we ever have another war, I think we will have learned some lessons from

this one. We will know where the bottlenecks are likely to be and we will not take out of the labor force those people drafted into the Army. That, I think, is the secret."

Mr. Nelson inferred a mistake had been made by Army Services of Supply a year ago in cutting back heavy artillery and ammunition and said that the Ordnance Department, however, had never been convinced that bombs could take the place of big guns.

"Now that requirements have been increased, we have to take the lead factor into account.

"You cannot cut a program down, increase it sharply, and expect to go up at once. It cannot be done. It is not physically possible. If you schedule it to go up, it still won't make it go up, and no browbeating of anybody can make it go up."

Allots 165,000 Tons Steel For Fourth Quarter Steel Drums

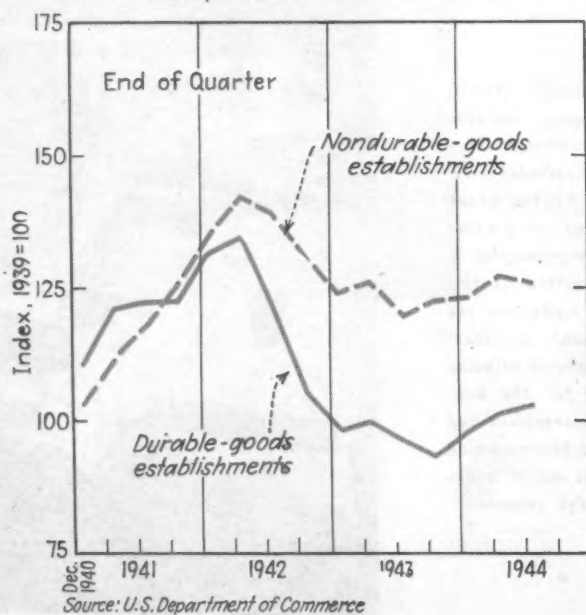
Washington

• • • WPB has allotted 165,000 tons of steel for fourth-quarter production of steel drums under the Class B products program. As of mid-August, orders for nearly all the allotted steel have been placed. The new allotments, added to current inventories, should be sufficient to meet all requirements, according to WPB. However, the Steel Division may be asked to redirect some orders in an effort to pro-

vide balanced inventories throughout the industry.

Navy requirements for the fourth quarter are about 1,200,000 steel drums. Orders for about 600,000 or 700,000 of these drums were placed in May and June. Procurement of about 600,000 was undertaken in July and orders for part of this amount have been placed. The Navy's fourth-quarter requirements represent about 45,000 tons of steel

WHOLESALE'S INVENTORIES



IMPORTANT TRENDS: While retailers' inventories of durable and nondurable goods increased somewhat during the first six months of 1944, the similar trends recorded for wholesalers' inventories was less pronounced. Although the first six months' figures indicate a rise, future trends during the balance of this year will probably be downward.

Miners Strike and Government Takes Over for Second Time in Year

Pittsburgh

• • • For the second time within a year, John L. Lewis, head of the United Mine Workers, has permitted his miners to go on strike, and for the second time within a year, operation of the mines has been taken over by the United States Government. While some term the strikes a defiance of common decency and a threat to victory that is within our grasp, the other side of the fence shows a picture of organized labor helping the poor and downtrodden miner. However, it isn't the miner this time that is involved. It is his boss—the supervisor, fireboss, assistant fireboss, foreman, and electrical foreman—that is the crux of the present disturbances.

Through District 50 of the UMW, the United Clerical, Technical, and Supervisory Workers of the mining industry, are putting on their drive for union representation. John McAlpine, president of this District 50, is an aggressive organizer, defying the mine owners, as well as the War Labor Board, and apparently willing and able to take on all comers. His actions following government seizure will be awaited with a great deal of expectancy. He wants first the technical and supervisory workers organized, and the clerical workers can be taken in later. Consequently, strike vote elections include balloting by

only the former classes of employees. There is the logic of futile attempts to organize clerical and white collar help in other industries by other unions that may be the reason for their exclusion at this time.

When bulldog John L. Lewis bares his teeth in anger at happenings in or around his coal mines, everyone sits up and takes notice. This drive is no exception. Strike vote elections, after the 30-day cooling off period,

• • • Government seizure of eight more mines, bringing the total to 18, followed strikes and Labor Day absenteeism. It was reported that 67 mines were idle sometime during the weekend with eight being closed by strikes. The continuance of government seizure is certain as strikes progress.

that were held last week clearly showed the antagonistic attitude of the voters, since at even the very few mines that voted to work were pulled out on strike by roving pickets. By the end of the week there were nearly a dozen mines out, crippling coal production to the tune of about 50,000 tons a day. At this point, the War Labor Board washed its hands of the matter by turning it over to President Roosevelt.

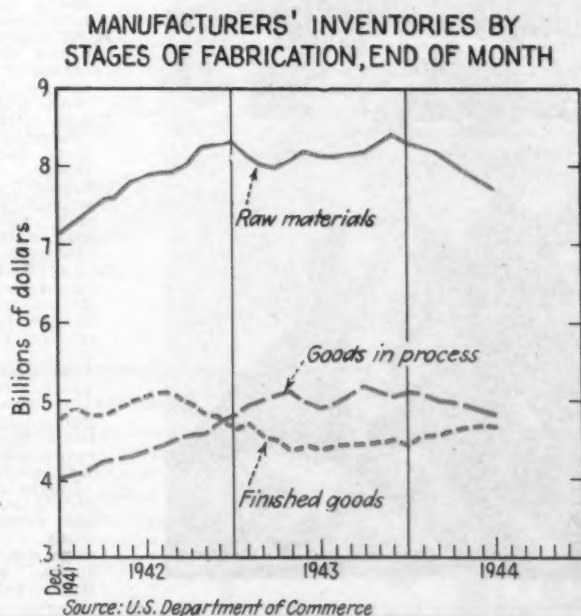
On Aug. 31, the government, through a presidential seizure order, reached into the district and took possession of 10 mines that were striking. The Interior Department, the agency in direct control after the seizure, took over eight mines of the Rochester and Pittsburgh Coal Co., and two mines of Ford Collieries Co. The Solid Fuels Administration of the Interior Department announced that the mines would be open for operation on Sept. 4, in spite of the fact that this was Labor day. Thus, with government operation, strikers are subject again to the prosecution statutes of the Smith-Connally Anti-strike Act. While taking over the mines is designed to end permanently the strike, it is not certain that the action will be 100 per cent effective. If the strike vote elections are held at other mines, it is likely that the government will move into these mines, since it is practically certain that the majority of them will vote for a strike.

One of the peculiarities of this drive with its strikes was the fact that the bulk of the strike vote elections and the strikes that occurred were in mines that produce coal mainly for coking purposes in by-product ovens—in other words, metallurgical coal. While the Solid Fuels Administration estimated an average supply of such coal to be about 15 days' stock, this estimate is believed to be a little high. For example, the Clairton Works of Carnegie Illinois Steel Corp. has only about three days' supply. With Clairton furnishing the bulk of the coke and gas for the other Carnegie Illinois plants in the Pittsburgh district, a prolonged and general strike would quickly tie these plants up in knots. Coal for steam purpose was in better supply, estimated at 40 days, so there were very few steam coal mines that were involved in the strike. A blitzkrieg organization drive could not stand a strike where coal supplies were sufficient to last more than a month.

The reason for the drive on organization of supervisory workers at this time is not too clear. In numbers, these workers total only between 10 and 15 per cent of the working forces at the mines, and an organizational drive for these members seems picaresque. However, some observers believe there is a definite political motive behind the drive, which was certain to cause sporadic strikes if not a national strike. It is known that Mr. Lewis is on the outs with President Roosevelt.

INVENTORY CONTROL:

Closely related to developments on the war production front manufacturers' inventories of raw materials and goods in process have taken a downward trend during the first six months of 1944. The book value of manufacturers' inventories at the end of June was about equal to that of two years ago. The trend is expected to continue downward and is considered to be in a healthy condition.



Curtailment of Maritime Ship Construction to Be Affected Soon

Pittsburgh

• • • At long last those who go down to the sea have enough ships to carry them and their cargoes to the fighting fronts all over the world and curtailment of Maritime ship construction is at hand. Starting with January, 1945, plate directives will be cut more and more each month, so that by March, it is estimated that plate rollings for merchant ship construction will be only about 20 per cent of those for December, 1944. This is quite a severe trimming, but it is a sure indication that the shipbuilding program of the Maritime Commission has at last caught up with the needs.

While it is not known that like curtailments of orders for the Maritime will be made on other products, it is believed that the whole setup of Maritime needs will undergo a similar cutback, since the Maritime program has long been dependent mainly upon its plate supplies.

There have been no alterations in the plate schedules for the remainder of this year. Maritime Commission schedules will go along about as they are until the end of the fourth quarter. This would indicate that at the present high level of requirements plus the additional schedules for the first quarter of 1945 before July 1, 1945, Maritime shipbuilding will be about completed and ship construction for that agency will drop to a very low point.

While there has been some speculation for the past two or three months as to how long the merchant shipbuilding program would continue at its present high rate, few were willing to hazard a guess. Taking the guesswork out of the problem, WPB very recently began its bobtailing job. Cutbacks scheduled at present run about like this: January directives are about 85 per cent of those of December, 1944; February's run about 66 per

cent of December's; and March directives are only about 20 per cent of those for December.

Figured on a tonnage basis, it will mean that many thousands of tons of flat rolled capacity will be open by the end of the first quarter of 1945, and a general easing of the supply situation on all types of flat rolled products will be possible. The effects of this cutback will probably be greater than for any other one product manufactured by the steel industry.

New Production Facilities For 155 mm Shell Gets Start

Minneapolis

• • • New production facilities for production of 155 mm. shells will be installed in unused buildings of Twin Cities ordnance plant near here to fill an eight million dollar contract whose receipt was announced Aug. 29 by National Can Co. Shell production is scheduled to start in November or December. The plant was shut down recently and it will be necessary to remove old equipment before new facilities can be installed.

War Department Releases Dramatic War Action Film

• • • The War Department has completed and is releasing a dramatic war action picture entitled "Men of Fire." Its purpose is to emphasize the part that castings and forgings, now constituting bottlenecks, play in the fight for victory in all parts of the world.

This film should be a morale raiser in all plants that produce such products and could well be shown for that

purpose. The film may be obtained without charge on request to Motion Picture Branch, Industrial Services Division, Room 1315, 1501 Broadway, New York 18, New York.

Other films obtainable from the same source for showing in industrial plants are as follows:

FILM COMMUNIQUE SPECIAL ISSUE 2 (LCT, trucks, tractor, jeep, bulldozer, AA gun, landing float, tank, skate conveyor, ducks, bombs, strafing and pursuit planes, B-17, locomotive and wheels, shells, boiler housing, transport planes).

HOW GOOD IS A GUN? (Jeep, heavy machine gun, mortar, tanks, 37, 57, and 105mm cannon, 155 with tractor, 240 with tractor).

FILM COMMUNIQUE NO. 6 (Ships, planes, landing boats, jeep, B-24, tanks, tractors, trucks, bulldozers, "grasshopper" plane howitzer, pipe-wrench, pipe valves, pumping unit, gasoline nozzles, B-17 and engine, bulldozer, sheep-foot roller).

EARTHMOVERS (Jackhammer, excavating machinery, bulldozers, graders, rollers, guns, planes, ducks, shovel, gun and tractor, Treadway bridge, well drill).

FILM COMMUNIQUE NO. 7 (Jeep, trucks, guns, ships, bulldozers, conveyors, AA guns, pursuit planes, landing boats, mortar, tractor, howitzer, tanks).

FILM COMMUNIQUE NO. 8 (Jungle conditions—heat and dirt, A-20, B-17, B-24, American airplane scrap in Germany, tanks, LCT, trucks, ships, guns, tractors, AA guns, ducks, bulldozer, wounded Negro soldier).



EFFICIENT MATERIAL HANDLING WILL BE IMPERATIVE IN POST WAR PRODUCTION

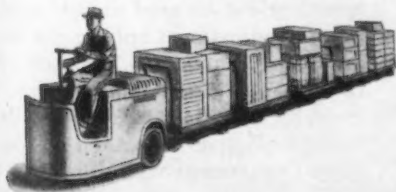
... let **MERCURY** help you plan your system **NOW**

Indications are that keen competition in the post war market will force prices down . . . this in spite of increased labor and materials costs.

One important opportunity for production economy is in material handling. Experience has proved that efficient handling can reduce finished costs as much as 10 to 20%.

Mercury can help you plan an efficient handling system. As pioneer builders of material handling equipment Mercury has the experience and the engineering "Know How" to analyze your specific problems and to recommend solutions. For example, here is the background Mercury has to offer you:

1. Originators of the "Trackless Train" system of materials handling. The fact that thousands of Mercury tractors and many times that number of Mercury trailers are serving throughout industry is evidence of the popularity of the "Trackless Train" system.

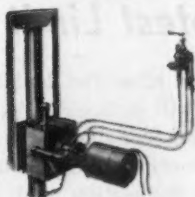


FREE—New MERCURY Catalog

Attractively designed. Equipment is illustrated in natural colors and with full specifications. 40 pages of helpful information to the handling executive. Write for your copy.



2. Mercury has pioneered and perfected many important industrial truck features. Those illustrated are standard on all Mercury fork trucks. While these features vary slightly on Mercury platform trucks, the basic principles are the same—



Hydraulic Hoist: No power required to lower load, no power wasted in lifting. Less than 50% of the usual moving parts.

Snap-action cam operated controller: Eliminates injurious arcing. Reduces maintenance to the minimum.



Unit constructed drive assembly: Motor and drive are one unit. Double reduction spiral bevel and spur gears transmit maximum power.

All welded frame: No rivets to weaken sections. Exterior is smooth and pleasing in appearance.



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MERCURY

TRACTORS

TRAILERS • LIFT TRUCKS

Industrial Briefs . . .

• **WEST COMES EAST**—To the National Metal Congress being held in Cleveland will come a large delegation from the West to merchandise the industrial advantages of the area to the metal industry. The Los Angeles Chamber of Commerce and the State of Washington will bring out the advantages in specially-prepared exhibits.

• **ACQUISITION PLANNED**—Dresser Mfg. Co., Bradford, Pa., will call a meeting of stockholders on Oct. 16, preparatory to acquiring the assets of the International-Stacey Corp., Columbus, Ohio. Through the acquisition, Dresser will become a major supplier of oil and gas drilling equipment.

• **CELEBRATION**—Jones & Laughlin Steel Corp.'s McKeesport Works, McKeesport, Pa., completed its three millionth howitzer shell making a total of more than 4,000,000 steel shells and bomb cases of various sizes that have been produced in the plant for Army Ordnance.

• **NEW SERVICE**—Demco Tool Service, Inc., at 5236 San Fernando Road, Glendale, Cal., has been formed to provide field engineering service on machine tooling to undertake tool reconditioning and to handle job-broaching for West Coast manufacturers. Russell W. Luzius will direct the new firm.

• **CHANGES HANDS**—Crucible Steel Casting Co., Milwaukee, has been taken over by J. C. Barcus and R. A. Braunberger, Chicago, who purchased controlling interest from Walter Lange and Fred A. Lange.

• **LABORATORY OPENED**—Pesco Products Co., Cleveland, a division of Borg-Warner, has opened experimental laboratories for research on vital war-plane equipment.

• **NEW PLANT**—Alloy Rods Co. announces that it has received WPB permission to construct a new two-story all brick plant.

• **BUYS COMPANY**—U. S. Steel Products Co., subsidiary of U.

S. Steel Corp., has acquired the manufacturing assets of Bennett Mfg. Co., makers of steel drums. The two plants of the Bennett Co., located at Chicago and New Orleans, will be operated as the Bennett Mfg. Division of U. S. Steel Products Co.

• **WESTERN REPRESENTATIVE**—Moore Machinery Co., Los Angeles, has been appointed exclusive representative in the Los Angeles territory for the complete line of Reed-Prentice high pressure die casting machines and its improved type of plastic injection molding machines.

• **EXPANSION**—Wyckoff Steel Co., Pittsburgh, announces the acquisition of the properties of the Empire Finished Steel Corp. in Newark, N. J., and Putnam, Conn. The Newark plant will be operated as the Empire Works and the Putnam property as the New England Works.

• **REPRESENTATIVE APPOINTED**—Whiting Corp., Harvey, Ill., announces appointment of the Cardinal Supply & Mfg. Co., Omaha, Neb., as its exclusive sales representative in the Omaha territory.

OPA Eliminates 60-Day Protest Limit

Washington

• • • Pointing out that its action, effective Sept. 4, is in accordance with recent congressional amendments to the Emergency Price Control act, OPA last week announced elimination of the 60-day time limit in which protest could be filed against the denial of an application for adjustment of a maximum price for commodities or services under government contracts or sub-contracts.

No specific statutory time limit now exists within which protests can be filed, but OPA drew attention to an opinion of the United States Emergency Court of Appeals that if the filing of a protest is unduly delayed the defense of unreasonable delay may be available to OPA. Accordingly, OPA said, if a protest is filed more

than 90 days after the denial order is issued, it will ordinarily regard the delay as unreasonable. This principle, the announcement said, has been adopted in connection with the submission of protests against denial of adjustment applications in cases other than sales to the government.

A second change made in the procedure for adjustment of maximum

prices on commodities or services under government contracts or sub-contracts provides that where a seller enters into a contract with two or more purchasing offices of the War or Navy Department situated in two or more regions he need file his application for adjustment only in the region in which his plant is situated. Previously, applications had to be filed in each region in which the field purchasing office or depot of the War or Navy Department was situated.

COMING EVENTS

Sept. 10-13—National Metal Trades Association, Lake George, N. Y.

Sept. 13-14—American Hot Dip Galvanizers Association, Inc., Chicago.

Sept. 25-27—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 5-7—SAE National aircraft engineering & production meeting,

Los Angeles.

Oct. 5-7—National Electronics Conference, Chicago.

Oct. 5-6—AIME Electric furnace steel conference, Pittsburgh.

Oct. 10-11—Gray Iron Founders' Society, Inc., Cincinnati.

Oct. 12-14—The Electrochemical Society, Inc., Buffalo.

BATTERY WELDING

The HOW and WHY of STORAGE BATTERY WELDING



See Page 5

PROGRESSIVE WELDER CO.
3050 E. OUTER DRIVE • DETROIT 12, U.S.A.

Bulletin No. 902

Here are the answers to your questions about the most striking new development in resistance welding—making resistance welding useable wherever there is enough power to operate a simple battery charger.

WHAT IT IS . . .

How does it work and why?

WHERE TO USE IT . . .

What kind of welding?
What kind of machines?
How much power?

WHAT ABOUT INSTALLATION? . . .

Portability?
Floor space?

WHAT ABOUT COST? . . .

Initial cost?
Operating cost?
Efficiency?

HOW IS IT OPERATED? . . .

How much skill?
What kind of controls?
Safety?

WHAT ABOUT MAINTENANCE? . . .

How much skill required?
Reliability?
Adjustments?

Ask for 12 page booklet (No. 902)
"How and Why of Battery Welding"

BUY U. S. WAR BONDS

PROGRESSIVE WELDER CO.

SEAM PROJECTION & BUTT • Electric Welding Equipment • PORTABLE GUN & PEDESTAL
3050 E. OUTER DRIVE • DETROIT 12, U. S. A.

Contract Settlement Officer Training Now Moving at Fast Clip

Wright Field, Ohio

••• Preparing to meet the heavy demand for trained personnel to handle contract settlement and property disposal, the AAF Materiel Command here has stepped up its officer training to fill these positions. With the recent establishment of a course at the Harvard Graduate School of Business Administration, officers are now being trained in four centers.

Courses covering one month are held at Vandalia, Ohio, and at the Judge Advocate General School at the University of Michigan, Ann Arbor, Mich. Two-month courses are held at the Harvard Business School, Cambridge, Mass., and at the Army Industrial College, Washington, D. C. In these schools the Materiel Command will train more than 3000 officers, who will be assigned to contract termination, contract settlement and property disposal.

Officers selected for the special training have civilian backgrounds as top-flight businessmen, bankers, lawyers, financiers and manufacturers. All have been selected, after an extensive screening of Air Force personnel, because of their ability to meet rigid qualifying requirements.

War production is still the first

order of the day, the Materiel Command emphasizes. Most of the contract cutbacks now taking place are the result of changes in requirements dictated by design innovations, strategic considerations and similar factors. Generally, no overall lowering of the rate of war production is effected. However, as part of its program of advance planning, the Materiel Command is building up its organization to handle the mass of contract terminations which will take place with the defeat of Germany, and later, at the end of the war. The Command feels that the availability of specially qualified officers will be an important factor in making possible a prompt and orderly conversion for war to peace production, with a minimum disruption of the national economy.

Upon completion of the training course, officers are assigned in accordance with their qualifications, either as contracting, negotiating, property disposal, or legal officers. Of a typical class, more than 90 per cent of the graduates are assigned to one of the six district offices of the Materiel Command, in line with the policy of decentralization of contract settlement.

Establishment of contract settlement teams, which will include specialists in the various phases of

the work, is being accomplished as trained personnel become available. More than 500 officers have already completed the training course, and are now operating either in the field or in administrative capacities at Wright Field headquarters. More than 600 officers are in training at this time. Military background of the student officers includes a wide variety of previous assignments, with a recent increase being shown in the number of officers returned from duty overseas.

Latin American Technical Paper Started by Westinghouse Pittsburgh

••• The first issue of *El Ingeniero Westinghouse*, a new technical magazine for Latin America, is scheduled for release Sept. 1, 1944, according to an announcement by John W. White, president and general manager of the Westinghouse Electric International Co.

Printed in Spanish, the new bi-monthly publication will be made up of articles out of recent issues of *Westinghouse Engineer*, plus additional engineering information of special interest to technical readers. Mr. White said, "By this means we shall be able to give some information of recent advances in North American electrical research, and thus establish one more point of contact between the engineers of our two continents."

Rocket Power Used to Assist Take-Offs

Wright Field, Ohio

••• Rocket power is successfully helping heavily laden planes into the air according to an announcement by the AAF Materiel Command here. Despite the successful nature of these tests, these take-off units probably never will see tactical use as engi-

neers have found this use extremely limited. Below, at left, an A-20, experimentally equipped with rockets to shorten the run, takes off from Wright Field. At right, below, flames and smoke issue from this B-25 medium bomber's fixed assisted take-off also undergoing tests at the field.



AUTOMATIC WELDING has many advantages in fabricating boiler drums, cracking stills and other products for which repetitive welding is practical. Deposit rate is often greater because of the use of higher currents, and a larger ratio of welding time to working time, compared with manual welding. The strength and high quality of the weld are due to the close control of the arc and the excellent fusion possible at high currents using Murex Electrodes.

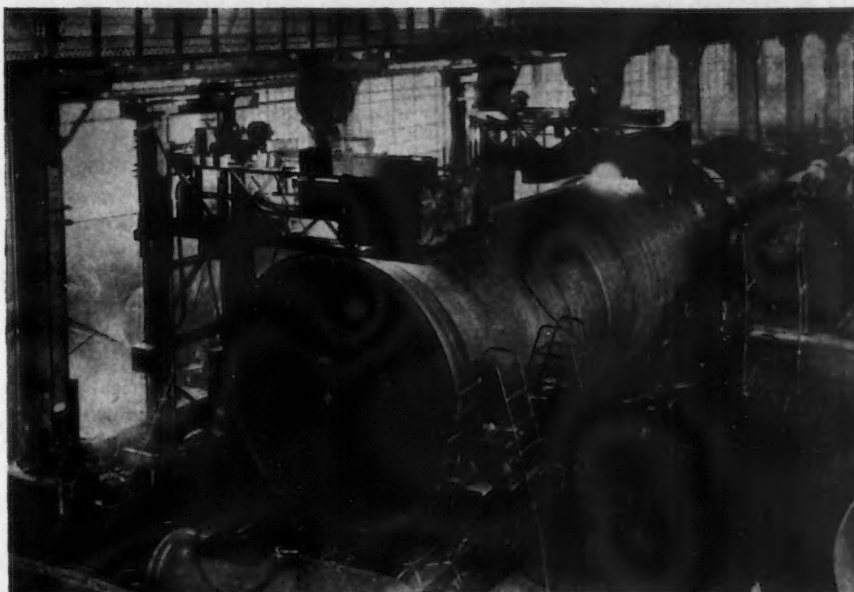
Murex rods available for automatic welding are Type F, Carbon Moly. 50 and Cromansil. The spiral asbestos winding of these rods anchors the coating to the core wire so that the electrodes may be coiled without cracking and also provides an absolutely concentric coating that does not spawl off under the slitter.



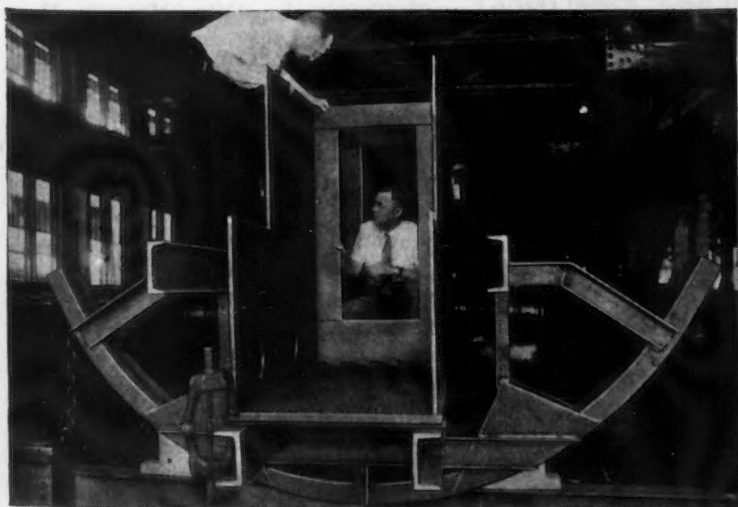
THIS STRIKING action photograph illustrates the use of Murex Electrodes in welding the top member of a single action, single eccentric press, fabricated by Clearing Machine Corporation. Press frames are positioned with only four turns. The sides weigh from 80,000 to 90,000 lbs. and some plates are 10" thick. Double-Vee welds, back-stepped, are employed.



HUGE PRESSURE VESSELS over 6' in diameter, up to 35' long and having a shell thickness of 4" to 5" are welded automatically by Foster Wheeler Corporation with Murex Type F and Carbon Moly. 50 electrodes in continuous coils. The soundness of the weld metal is shown by the fact that as many as 44 longitudinal boiler drum seams have been welded consecutively, with only five minor defects showing up under X-ray examination.



CRANE GIRDERS are subject to severe overloads and the shock of sudden stops and quick reversals. Manning, Maxwell & Moore, Inc., applying a special technique, uses Murex Electrodes in the construction of its "Shaweld" crane girders. They are much stiffer laterally than riveted girders and more resistant to the twisting motion set up by the driving machinery. Positioning cradles are used to permit downhand welding on the girders which are exceptionally long and heavy.



MUREX
ARC WELDING ELECTRODES

**METAL & THERMIT
CORPORATION**

120 Broadway, New York 5, N. Y.

ALBANY • CHICAGO • PITTSBURGH
SOUTH SAN FRANCISCO • TORONTO



Specialists in welding for nearly forty years. Manufacturers of Murex Electrodes for arc welding, and of Thermit for repair and fabrication of heavy parts.

Pressure Cabins Solution To Problem of High Altitude Flying

Wright Field, Ohio

• • • Pressurized cabins, perfected after more than ten years of development work by the AAF Materiel Command, now permit our war planes to fly up to 40,000 feet.

Pressurization has opened military and commercial vistas of great interest for, while currently a military concern, pressurized cabins may be applied commercially in postwar years as a means of comfortable, safe travel in the storm-free stratosphere. Now, these cabins provide the answer to high altitude, long-range aerial bombardment. The rarefied air of high altitudes confronted AAF engineers and aero-medical experts with two major problems: How to enable both gasoline engines and human beings to operate at extreme heights.

Solution of the engine problem came with the supercharger. This mechanism pumps and compresses the thin upper air so that an engine obtains enough oxygen for proper combustion. But there remained the matter of the human reaction to altitudes above six miles up where air pressure is only one-fourth as much as at sea level.

In 1919, AAF engineers began work on the problem of pressurization by constructing pressure equipment on a DeHaviland observation plane. Elliptical in shape, the cabin leaked badly and was of no practical value. The project was dropped.

Interest in the problem was revived in 1934. Experts of the aero-medical laboratory of the Materiel Command built a decompression chamber in which to study the effects of high altitude on man. They found that it was not simply, as many had supposed, a problem of providing oxygen at 35,000 feet and above, but also a problem of pressure.

The demand system of oxygen supply provides fliers with more oxygen as altitude increases until at 30,000 feet all air is shut off and the flier breathes pure oxygen. However, even pure oxygen will barely keep a man alive up there. The pressure is so low that insufficient oxygen is forced through the membrane between the air sacs of the lungs and the blood stream. More pressure must be provided.

The first attempt at a solution was a pressurized suit, which actually was just blown-up overalls and a diver's helmet. It didn't work. Then two Materiel Command officers went up to 72,935 feet, a world's record, in a spherical balloon gondola. A sphere offered the ideal pressurization shape, but they couldn't put wings and an engine on a sphere and fly it, so Materiel Command experts began experimenting with cylindrical shapes and in 1936 came out with the XC-32, a Lockheed transport and the first successfully pressurized air frame. It won the Collier trophy for Maj. Carl F. Green, its perfecter.

The cabin worked but at high altitudes, windows iced heavily on the outside and clouded with fog and moisture on the inside. Small fans, similar to those in use by motorists in winter, solved the problem.

Sealing the structure also was a major problem. Thin rubber cement was poured in doors and joints and the cabin was pressurized so that at an altitude of 20,000 feet, the cabin had an interior pressure equal to sea level—14.7 pounds per sq. in.

Boeing then built the 307, an airliner, but it wasn't the whole answer. Next came the XB-28, a North American design, in which AAF engineers supercharged the cabin to a pressure equal to 8,000 feet when the plane was at an actual altitude of 30,000 feet. This was nearer modern performance.

Three methods of pressurizing were developed. First was the auxiliary impeller geared to the supercharger. Second, the mechanical supercharger geared to the engine. In the third method, used on the B-29, a duct leading to the cabin is cut into the duct leading from the engine's supercharger to the carburetor—the cabin utilizing part of the air pulled in for the engines of the supercharger.

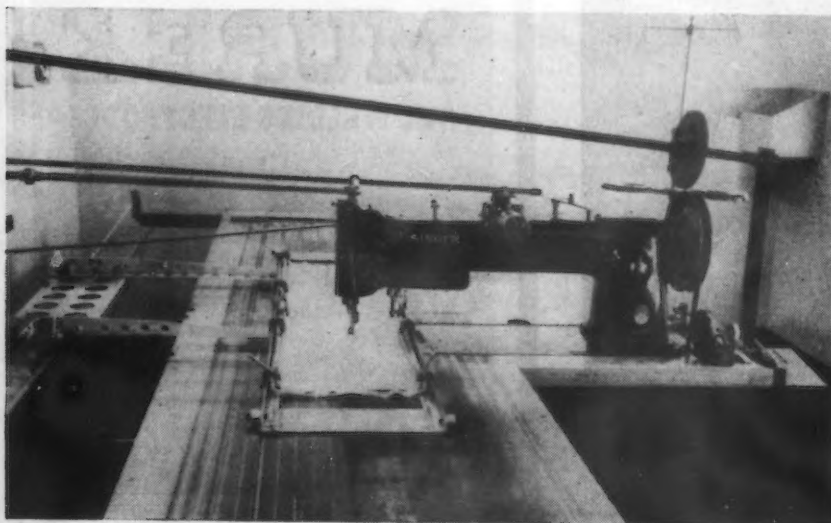
The pressurized cabin of the B-29 has a pressure differential of 6.55 pounds. This means that when the plane is at 30,000 feet the interior pressure is equal to 8,000 feet; that at 35,000 feet the interior pressure is at 10,200 feet.

Most commonly asked question concerning pressurized cabins, and one which early occurred to Materiel Command experts, is "What happens if something ruptures the cabin seal—enemy fire, for instance?"

In exhaustive tests, Maj. H. M. Sweeney of the command's aero-medical laboratory and others proved that the human body can stand such "explosive decompression." Rapid decompression, such as the abrupt bursting of the seal of a pressurized airplane flying at 35,000 feet, means the rapid expulsion of body gases, which greatly expand at high altitudes. But this is not serious and causes no pain nor injurious after-effects.

How high an airplane may fly is limited by body strength. By boosting the pressure differential to 7.5 pounds and using oxygen, a human may fly for long periods at 40,000 feet or slightly higher, present experimentation indicates.

COOKIE SEWING: A machine sews powder "cookies" to feed trench mortars at the Radford Ordnance Works, Radford, Va. In this queer industrial practice, trench mortar powder is made in pieces each about the size of a small cookie. Later machine-rolled powder is punch-pressed into squares.



WENATCHEE
ALLOYS, INC.
BROADENED
WENATCHEE VALLEY
ENTERPRISE

FROM APPLES to ALLOYS

THE STORY of WENATCHEE ALLOYS, INC.

Early in 1942 the W.P.B. in conjunction with the D.P.C. requested that the Ohio Ferro-Alloys Corporation undertake the design, supervision of construction and operation of an efficient ferro-silicon plant. In that same year Wenatchee Alloys, Inc., Wenatchee, Washington, was placed in operation under Ohio Ferro direction, with all production, then and at present, allocated by the War Production Board.

It is interesting to know that Ohio Ferro-Alloys and its subsidiary, Wenatchee Alloys, Inc., fulfilled this vital wartime obligation without a profit fee, and manages the plant without profit

participation or other fee. The personnel of Ohio Ferro-Alloys earned signal honors in quickly satisfying a critical need. Their feat reflected Ohio Ferro-Alloys skill and experience in ferro-alloy production.

You'll find the integrity of the Ohio Ferro-Alloys Corporation represented in the consistently high quality of their materials. And you'll appreciate cooperative service by well-informed men.

FERRO-SILICON 50%, 75%, 85%, 90%

FERRO-CHROMIUM • FERRO-MANGANESE

BOROSIL • SIMANAL

BRIQUETS

OFA SILICON, MANGANESE, CHROME



Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

Patents New Method For Brightening Electrolytic Tin Plate

New York

• • • Patent No. 2,357,136 dated Aug. 29, 1944, has been granted to John S. Nachtman covering improved methods of brightening electro-tin plate continuously. By the methods covered in this new patent, it is claimed that electro-tin plated strip can be brightened very economically at speeds up to and exceeding 1000 ft. per min. By using the principles disclosed in this patent, a further claim is made that the melting of the electroplated tin coating can be accomplished by

the high frequency electrical induction method or by the electrical conduction method at a fraction of the present costs. Also, oil or gas flames can be used to very great advantage as melting mediums. Previous Nachtman patents have been concerned primarily with brightening of the electro-deposited coatings in hot palm oil baths, whereas other inventors have inclined more to high frequency or electrical conduction methods, or high intensity gas flames of the selas type.

Social Security Postwar Policies

Washington

• • • The Chamber of Commerce of the United States submitted to a vote of its members recently a set of postwar policies on social security.

In one of the most important referenda in the organization's history, the member organizations were asked to approve or reject a list of 21 proposals on general social security policy, federal old-age and survivors' insurance, employment services and unemployment compensation, and medical and cash sickness benefits. Voting will close Sept. 26 and the ballots will be tabulated immediately thereafter.

President Eric A. Johnston in a let-

ter to the members appealed for full participation in the voting, recalling that the Chamber has no over-all policy on social security.

In announcing the referendum, Ralph Bradford, general manager of the Chamber, pointed out that the 21 proposals grew out of a year's study by the Chamber Committee on Social Security headed by Marion B. Folsom, Treasurer, Eastman Kodak Co., Rochester, N. Y. The propositions were accompanied by a voluminous report from the Committee, as well as the opposing arguments of a separate committee headed by W. S. Rosecrans, of Los Angeles, Calif.

The referendum states at the out-

set that however desirable and necessary a social security program may be, it is no substitute for productive employment and, therefore, every effort should be made by business and other groups to encourage high levels of production and steady employment. But, it asserts at the same time that protection should be provided against the period of job and income losses that are a natural consequence of the workings of a "free and changing society."

"Every effort should be made to encourage state and local governments to assume the primary responsibility for the social security program in order to keep the program close to the employers, the employees and the taxpayer," the proposals state.

New Oil Well Drilling Rules Relax Restrictions

Washington

• • • The size of drilling units for new oil wells in 79 fields in Texas and Louisiana has been reduced from 40 acres to 10 acres, Deputy Petroleum Administrator Ralph K. Davies announced recently.

This action was taken by the issuance of Supplementary Order 13 to Petroleum Administrative Order 11, which controls the use of critical materials in petroleum production operations.

Under the new supplementary order an operator may drill a new oil well on a 10-acre unit, provided the unit is in the salt dome fields and fields of similar characteristics listed in an exhibit attached to the order.

The reworking, deepening, or re-completion of old wells into another pool in the specified fields may be carried out on a 10-acre pool spacing basis.

Mr. Davies pointed out that nothing in the supplementary order suspends applicable state regulations respecting the distance between wells and the distance of wells from property lines.

The new order will eliminate the necessity for filing a large number of applications for authority to drill on units of less than 40 acres, a condition that prevailed because of the complex geological conditions in the Texas and Louisiana fields, Mr. Davies said.

In fields in Texas and Louisiana that are not specifically listed in Exhibit "1" of Supplementary Order 13, the provisions of Supplementary Order 12 to PAO-11 will still apply, Mr. Davies explained.

AERIAL MIGHT: Lined up, ready and waiting for combat, these B-17 Fortresses are only a small portion of the aerial might assembled in England as replacements for the strategic bombers of the U. S. 8th Army Air Force.



MAKE IT *Easy*

AND *Quick!*



FROM THIS TO THIS
— ONLY 31 SECONDS

Shakeproof Cowl Fasteners quickly unlock with about 1/4 turn of screwdriver!



FROM THIS TO THIS
— ONLY 43 SECONDS

Stud fits back into spring unit—another 1/4 turn and fastener is locked!

Cross pin holds stud in removed panel making replacement easier and faster!

INCORPORATE THIS QUICK-LOCKING SALES FEATURE INTO YOUR PRODUCT... **SHAKEPROOF** ENGINEERS ARE READY TO HELP YOU!

Products that provide for fast servicing definitely offer added utility to the user. Shakeproof Cowl Fasteners assure the fast opening and closing of all types of covers, doors and panels. Even though the parts are constantly removed and replaced, these fasteners retain indefinitely their locking power and resist severe vibration.

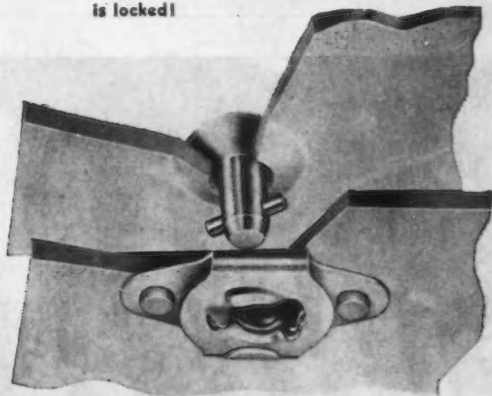
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Twisted Teeth



Shakeproof Type 1
Thread-Cutting Screw
for Metals



Shakeproof Type 25
Thread-Cutting Screw
for Plastics



Semi-Fastener Units
Pre-Assembled Shakeproof Lock
Washer and Screw

New Helicopter Now Under Development by Materiel Command

Wright Field, Ohio

• • • With twin rotors whirling at the ends of streamlined pylons, the Platt-LePage helicopter XR-1 probably is the most eye-arresting, "Buck Rogers" aircraft now being tested by engineers of the AAF Materiel Command.

Ultimately, the XR-1 may reach production. It may yet see military service in a variety of uses, but, while successful in tests, the strange-looking craft is still experimental.

"Advantages seem to lie six to one, half a dozen to the other, between dual and single rotor helicopters at present," said Col. H. F. Gregory, chief of the rotary wing branch of the AAF Materiel Command's Engineering Division. "We are thoroughly exploring the helicopter field."

Only two helicopters, the R-5 and R-6—single rotor ships developed by the Materiel Command and the Vought-Sikorsky division of United

Aircraft Corp.—are in production, according to Col. Gregory.

Military uses of aircraft capable of vertical flight, and zero (hovering) speeds, as well as forward motion, are obvious. They include personnel rescues from jungles or remote areas inaccessible to ground crews or to other aircraft, liaison and messenger service within combat zones and behind combat lines, and observation and fire control work in forest areas.

Experimental history of the XR-1 dates to mid-1940, just 19 years after the U. S. Air Corps first ventured unsuccessfully into the helicopter field with a model designed and built by Prof. George De Bothezat.

Design of the XR-1 is basically the same as the successful German helicopter. It weighs about 4800 lb. Its fuselage resembles a normal airplane fuselage minus engine or propeller. The tail is of conventional design. The engine—a 450-hp. Pratt & Whitney, the most powerful ever installed

in a helicopter—is located approximately in the middle of the fuselage and is enclosed.

Two cockpits in tandem occupy the forward part of the craft and have sliding canopies like fighter planes. Compartment bottoms are of transparent plastic, allowing clear vision approaching the vertical and adding to the craft's usefulness in observation.

Extending from each side of the fuselage, just back of the cockpit, are two streamlined pylons, giving the impression of wings. Single rotors 30 ft., 6 in. in diameter rotate in opposite directions at the ends of the pylons, counteracting torque. Landing gear is conventional.

"The same thing would happen to the XR-1 that would happen to an airplane if a wing came off," was Col. Gregory's answer to the usual question of persons seeing the Platt-LePage for the first time. "But there is no more reason for a pylon or complete rotor to give way on the XR-1 than there is for a normal airplane wing to fail."

Currently in test is a revised model, the XR-1A, in which the pilot's cockpit is behind the observer. A mock-up of this ship was built and inspected about a month before Pearl Harbor.



SUPERFORTRESS FINS: Dorsal fins of the Boeing B-29 are lined up in Boeing's Renton, Wash., factory, for installation on Superfortresses under construction. Production program of the Boeing-designed bombers is most gigantic ever conceived.

Allegheny-Ludlum Steel To Appeal Foreman Decision

Dunkirk, N. Y.

• • • A New York State Supreme Court decision upholding the State Labor Relations Board in calling a collective bargaining election among foremen at the Allegheny-Ludlum Steel Corp. here, and confirming their choice of Chapter 58, Foremen's Association of America, will be appealed by the company.

A union spokesman said that in response to a request for a conference to consider bargaining for the foremen at the Dunkirk plant the company had advised him the issue would be carried to higher courts. The company contends jurisdiction is with the National Labor Relations Board and that the state board is without authority.

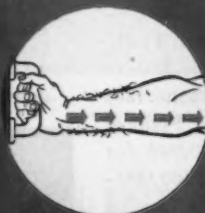
Chapter 58 petitioned the NLRB for an election and was told industrial foremen were classified as administrative employees and as such did not come within the scope of the Wagner Act. The chapter then petitioned the state board and the latter assumed jurisdiction.



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Hayden Bill Points To Large Federal- State Road Program

Washington

• • • That Congress is gradually moving toward consideration of Federal highway aid for postwar construction is indicated by the introduction this week of a bill providing \$650,000,000 annually by Sen. Carl Hayden of Arizona, according to a bulletin issued by the American Road Builders' Association.

The bill bears the approval of the Committee on Post Offices and Post Roads of which Senator Hayden is a member.

A somewhat similar bill is pending in the House where it is introduced by Congressman J. W. Robinson of Utah, chairman of the House Roads Committee. Both bills, however, will have to wait their turn until pressing overall postwar legislation has been handled, the bulletin pointed out.

Senator Hayden's bill would provide Federal highway aid of \$650,000,000 annually for three years, \$150,000,000 more per year than the Robinson bill. The Hayden bill authorizes \$250,000,000 annually for the Federal aid highway system, \$200,000,000 for farm-to-market roads and \$200,000,000 for principal streets in cities of 5000 population or more.

States, under the Hayden bill, would contribute 40 per cent of the cost of projects. That would provide a total annual highway program, with Federal funds, of more than a billion dollars.

In commenting on the bills, Charles M. Upham, engineer-director of the association, said: "Congress deserves commendation for finding time to devote to Federal highway aid in the face of such urgent matters as reconversion, surplus war properties and demobilization problems. It is plain that Congress recognizes the need for an insurance against unemployment. In the Committee reports accompanying both the Hayden and Robinson bills, stress is laid on the widespread employment that would be provided by highway construction in meeting urgent public needs.

"Highway engineers are getting the blueprints ready for a large-scale program. The nation's road builders can handle a program three times the size of the proposed Federal program. State highway departments are work-

ing on projects of a total cost of more than four and a half billion dollars and, according to survey made by this Association last spring, will have blueprints ready for \$1,300,000,000 in construction. Several states have stepped up their planning work since that time.

"The need for action is stressed in both committee reports which direct attention to the fact that 45 state legislatures meet early in 1945. It is vital to let the states know as soon as possible how much Federal aid and on what terms it will be available, so that matching funds can be obtained."

Consume Over 7 Million Tons Of Lake Superior Ore in July

• • • Consumption of Lake Superior iron ore for July this year, according to the Lake Superior Iron Ore Association, amounted to 7,371,733 gross tons of which 7,153,698 tons was used by United States furnaces and 218,035

tons by Canadian furnaces. This compares with a total of 6,887,640 for United States and 224,420 tons for Canada or 7,112,060 tons for June. The comparative figures for July a year ago were United States furnaces 6,939,852 tons and Canada 215,851 tons or a total of 7,155,703 gross tons.

Cumulative consumption for this year to date is 51,661,963 gross tons (50,138,315 United States and 1,523,648 Canada) as compared with 51,248,423 gross tons on the same date a year ago when United States furnaces had used 49,794,270 tons and Canadian furnaces had used 1,454,153 tons.

Ore on furnaces and Lake Erie docks amounted to 32,069,216 gross tons on Aug. 1, 1944, as compared with 26,655,414 tons a month ago and 32,388,932 tons a year ago.

There were 177 United States and 19 Canadian furnaces in blast on Aug. 1 as against 180 and 16 respectively a month ago and 182 and 10 respectively a year ago.

Heat Treating Furnaces Show Decline for the Year

Washington

• • • Monthly shipments of heat treating furnaces have shown a general decline for the past 12 months. However, during May, 1944, shipments amounted to \$4,817,000, representing an increase of approximately 24 per cent over the previous month. Unfilled orders have shown a similar general decline; however, a slight increase was recorded for May.

Heat treating equipment includes industrial furnaces for the heat treating of metal, including preheating. These data include both stock-assembled and field-erected furnaces. Metal-melting furnaces and industrial ovens for other than metal are excluded.

Data for the first three months of 1944 represent approximately 90 per cent of the industry and are based on reports from 90 companies. For April and May, 1944, the data represent 81 per cent of the industry and are based on reports from 40 companies.

CHOPPER BIRTH: A machine operator examines the "birth" of a 20 mm. anti-aircraft gun being assembled at the Center Line Ordnance plant operated for the Navy by the Westinghouse Electric & Mfg. Co. Similar guns shot down 32 Jap planes in Coral Sea battle.



(Thousands of dollars)		
Year and Month	Shipments	Unfilled Orders (End of Period)
1943—Total	116,693	20,682
1944—January	4,513	19,640
February ...	4,941*	21,451
March	4,772	21,183
April	3,655	20,659
May	4,817	23,405



NICKEL AIDS IN THE AUTOMOTIVE INDUSTRY

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a little Nickel goes a long way to provide essential dependability. It improves strength/weight ratios, increases wear and corrosion resistance, imparts toughness, and assures uniform properties of the metals with which it is combined.

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Aluminum Can Finds Price Primary Trap

Washington

• • • Experience has shown that price is the primary obstacle in the development of the aluminum can. This view was expressed by members of the WPB Can Manufacturers' Industry Committee at a recent meeting. All reported customer interest in aluminum can samples, according to a WPB statement, but said that price, "now at least twice that of a steel can for the same purpose, was greater than some classes of products can absorb."

WPB announced that allocation of steel for the fourth quarter had been established at 452,000 tons of prime plate and 10,000 tons of rejects. Committee members asked for postponement of full discussion of the allocation until the September meeting when the size of the late summer fruit and vegetable pack will be known.

Tin plate waste waste, industry representatives said, is being utilized by their plants as rapidly as it becomes available. They added, however, that blackplate rejects frequently accumulate in inventory. WPB officials said that further supplies of blackplate rejects are available.

Committee members, it was stated, concurred with the WPB suggestion that blackplate rejects could be most efficiently utilized by the addition of a new schedule to the Metal Can Order, M-81, authorizing the use of these rejects for the packaging of specified products now denied metal containers. Among the items that it was said could be adequately packaged in reject containers are some condiments, household oils, ink, cements and glues, disinfectants, baking powder, soap paste and some auto supplies.

AWS Reports on Welded Ship Construction Failures

New York

• • • Factors causing failure in welded ship construction and some suggested means for their control are presented in a report, "Structural Failures in Welded Ship Construction," published by the American Welding Society. This report is an extension of the principles set forth in the previously published report, "Thermal Stresses and Shrinkage in Welded Ship Construction."

The new report is tentative and is being presented at this time to assist

the shipbuilding industry in its welding problems until extended studies now being carried on are completed and fully reported. The report briefly reviews within nine pages the more important types of stresses and sets forth general precautions.

Copies of the report are available in the form of a 6 x 9-in. bulletin from the American Welding Society, 33 West 39th Street, New York 18, at a price of 25c. per copy.

Maintenance of Membership Ordered in CIO Union Dispute

Bettendorf, Iowa

• • • Maintenance of union membership, and check-off of union dues has been ordered by the Sixth Regional War Labor Board in settling a dispute between Ordnance Steel Foundry Co., Bettendorf, and United Farm Equipment and Metal Workers of America, local 144, CIO.

Provision was made for the usual 15-day escape period for union members who wish to resign before becoming bound by the check-off. It also was decided that as much notice as reasonably possible should be given of layoffs or reductions in the labor force. The union's request for an increase in night shift premium pay was denied, as well as request for a bonus of 4 per cent of annual earnings for employees of five years or more service.

WAR ENGINES: A pair of U. S. Army engines are being tested on the tracks outside the running shed of the plant. Invasion locomotives of this type have been rolling off assembly lines at the American Locomotive Co., Schenectady, N. Y., at a record pace.



Carbon Steel Demand Review Brings Steel Schedule Adjustment

Washington

• • • WPB Steel Division Director Normay Foy announced recently that steel mill production schedules have been adjusted as the result of cancellation or deferment of purchase orders for 300,000 tons of steel. This adjustment, Mr. Foy said, resulted from WPB's campaign to reduce backlogs of unfilled orders on steel mills.

In a letter of July 11, WPB directed a selected list of large users of carbon steel to review the demands of their current production schedules, to reduce inventories to minimum "working capital" levels, and to cancel outstanding purchase orders for the maximum possible tonnage. WPB field representatives visited plants of large steel users to assist them in reviewing their needs.

Mr. Foy said that further cancellations of mill orders are expected as a result of the item-by-item review of current requirements of carbon steel. He pointed out that steel consumers must continue to use inventory to a maximum extent during the next two quarters so that steel mill capacity will be utilized to produce only the most urgently needed requirements. He warned that the ending of the WPB campaign does not indicate that carbon steel has ceased to be in critically short supply.

Republic Steel to Erect Mill to Make Invasion Pipe

Youngstown

• • • Equipment to make 6-in. diameter invasion pipe of 1/8-in. wall thickness will be installed for the Defense Plant Corp. by Republic Steel Corp. here, according to R. L. Leventry, Republic's district manager.

The mill, complete with all the equipment needed to finish the pipe, will be erected in Republic's present tube mill building. It is understood that no additions will be required to the present power, water and steam facilities.

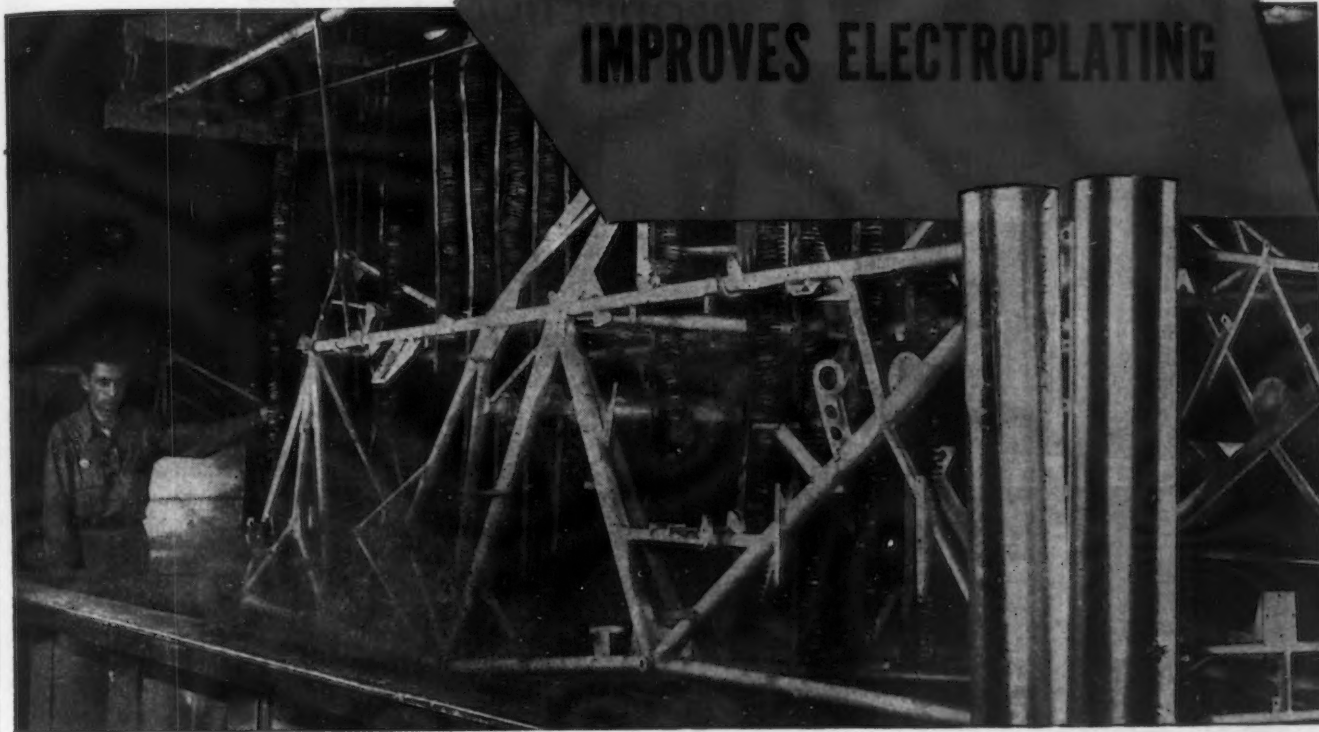
Work has commenced on the foundations for the new equipment, which is already en route here.

The new mill will supplement existing pipe making facilities and is expected to go into operation early in September. No tonnage figures on production can be given out because of wartime restrictions on information of this character.

Prosolv B

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NEW TURCO CLEANER IMPROVES ELECTROPLATING



Equally effective in still tank and electro-cleaning

So positive are the advantages of Turco Prosolv B that prominent electroplaters have switched to this new cleaner immediately following tests *although they had considered satisfactory the materials they had been using.*

Turco Prosolv B insures the chemical and physical cleanliness that is essential to 100% bonding to steel of zinc, cadmium, chromium and other plate. It removes every trace of oil, grease, smut, paint and rust preventive compound. It contains no soap; leaves no deposit. Rinsing is complete, even though parts may have dried.

A highly concentrated product, Turco Prosolv B is 100% active. Every particle works; there is no waste.

As this new cleaner is effective in both still tank and electro cleaning, it simplifies stocking and plant procedure where both processes are employed.

Try Turco Prosolv B for stripping tin deposits formed during certain electro-pickling processes. A standard

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This second step in preparing steel for plating is as necessary to a perfect job as the primary cleaning operation in Prosolv B. Any rust, mill, welding or heat-treat scale will prevent bonding of plate. Turco Descaler removes these

without attacking the base metal. Thus the combination of Turco Prosolv B and Descaler insures quality plating at low cost. Let us furnish full details.

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R-S Furnaces of Distinction

BUY WAR BONDS

NEWS OF INDUSTRY

Will Handle Carbon Steel Applications In the Field Offices

Washington

••• Applications for carbon steel and other controlled materials for added production of farm machinery will be handled until Sept. 15 through WPB field offices, instead of Washington headquarters. In making this announcement last week, WPB said the new plan is in line with decentralization policies and is also designed to extend local assistance to farm machinery manufacturers.

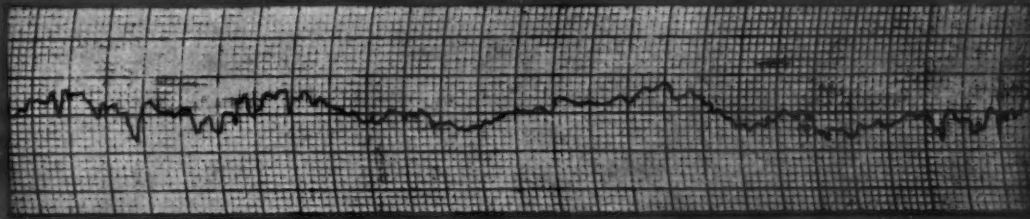
Upon expiration of Direction 4 to L-257 Sept. 15, manufacturers will be eligible for similar assistance under Priorities Regulation 25, the "spot authorization" order issued Aug. 15. The farm and equipment division of WPB, the announcement said, will notify manufacturers shortly concerning operations under PR-25.

The original purpose of Direction 4 was to permit manufacturers to file application for extra quotas against a reserve of 15,000 tons of carbon steel and proportionate amounts of other controlled materials for delivery under third quarter allotments. These materials were to be used with idle and excess inventories in the production of farm machinery over regular quotas, WPB said.

All such applications must be filed before Sept. 15, for amounts remaining from the reserve, officials said. Manufacturers who desire to increase their quotas of any items listed in Schedule B of the order, and new manufacturers with no quotas, are required to make application on WPB Form 3788. Application forms may be obtained from local WPB offices. In the case of manufacturers who need allotments of controlled materials, the application for increased quotas must be accompanied by Form CMP-4B.

Officials said that manufacturers' applications will not be approved if they involve substantial allotments of the following critical materials: Steel plates, sheet, strips, tin mill products, forgings, seamless tubing, wire rope and strand; copper and copper base alloy products—rod (½ in. and smaller), fine wire, cable and tubing (4 in. and over). Likewise, applications will not be granted if it appears that critical non-controlled materials or components are needed; that is, those items which manufacturers could not get with a rating of AA-4, WPB said.

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Can you match that finish? Sounds phenomenal, but you can do it with Chicago Wheels. And, the secret of their superiority lies in the new FV Bond, developed exclusively for Chicago Wheels, after 50 years' experience making wheels for the most accurate and precise applications.

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*Produce a better finish without sacrifice of production time — a finish so smooth that you can measure it in micro inches.

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Following statements are based on temperature range from 2200° F to 2700° F.

SHORT DURATIONS OF HEAT

Furnaces with daily or shorter firing cycles usually require a good clay or super duty brick.

MODERATE DURATIONS OF HEAT

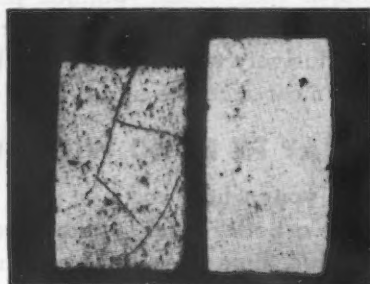
Furnaces with firing cycles of days, weeks or months require refractories which will not vitrify, shrink or spall, from the prolonged heats.

RM SEMISILICA BRICKS are made for this service. The picture at the right shows the results of 24 hours at 2650° F. on a First Quality Clay Brick and the almost unaffected RM.

LONG DURATIONS OF HEAT

Furnaces, intended to be run continuously can safely be lined with **RM SEMISILICA BRICKS**, provided the face temperature of the lining is below 2700° F. While silica bricks are ideal for continuous heats, a furnace may have to be shut down, which is hard on Silica Bricks, but **RM SEMISILICA BRICKS** take it easily.

Note. Some slags and gases attack refractories, so if in doubt, please ask or write for recommendation for your furnaces.



Compression, vitrification and spalling of First Quality Clay Brick, and relatively unaffected RM Semisilica brick after a run of 24 hours under heat and load.

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Handbook Shows The Revival of Interest In Mining of Gold

New York

• • • Chief development in the mining industry during the past 12 months has been the revival of interest in gold, it is shown by the 1944 edition of the Canadian Mines Handbook, published this week.

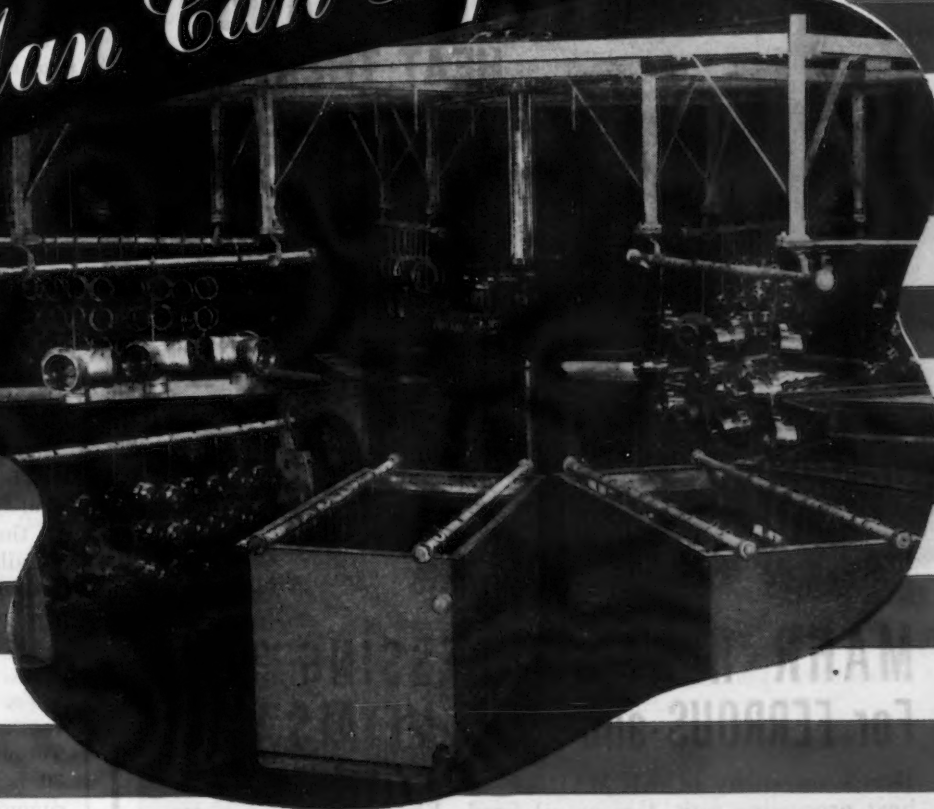
In the early years of the war practically all prospecting efforts in the Dominion were directed towards strategic minerals. With the improvement in the war metals situation, however, prospectors turned once more to a search for the yellow metal and discoveries in many parts of Canada have resulted.

Hundreds of new syndicates and companies have been formed to acquire claim holdings in areas all the way from Northwestern Quebec to the Yellowknife and British Columbia, and although government regulations have limited operations to sur-

ROCKET: British aircraftmen adjust a rocket into position on an RAF Mustang fighter. In recent months much air support has been given by the RAF to Marshal Tito's Partisan forces in Yugoslavia. Rocket-firing aircraft attack roads and communications.



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Here, he is cleaning aircraft propeller parts by the Bullard-Dunn Process prior to plating, but the machine is just as useful for conveying work through other sequences, such as

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- Fully automatic
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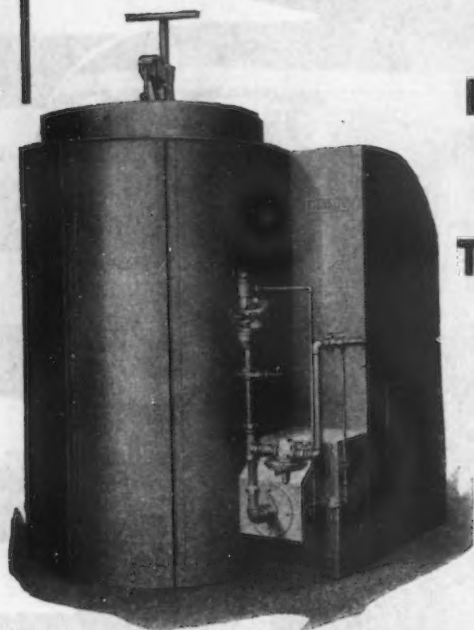
These machines were designed and are manufactured by The Bullard Company—known the world over for its machine tool engineering and fine workmanship.

Write at once for descriptive booklet giving full specifications.

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OR, DO OTHER HEAT TREATING PROCESSES AT LOWER TEMPERATURES

RECIRCULATING,
CYLINDRICAL —
ADAPTABLE FOR
PIT — CAN BE
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MAHR HEAT PROCESSING UNIT For FERROUS and LIGHT METALS WORK

Here's versatility in this MAHR convection heated, cylindrical heat processing unit. Gas or oil fired. Efficient burnering supplies a flood of heat within the heater which is distributed evenly and uniformly to the basket or salt pot in the heating chamber by a MAHR high temperature fan.

This unit is built for air drawing at 1250° F. or other heat treating of either ferrous or light metals at lower temperatures. Made in nine standard sizes. The smaller sizes can easily be used on the floor, and the larger sizes may be pitsunk for easier access.

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Used with great satisfaction for many years, MAHR Standard Heat Treaters are made in a wide range of sizes for both gas and oil firing. MAHR'S method of firing assures the utmost utilization of every heat unit within the fuel, gives greater uniformity and range of turn-down, and remarkable economy of operation.

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ALL EQUIPMENT FOR METAL HEATING

MANUFACTURING COMPANY

DIVISION OF DIAMOND IRON WORKS, INC.

1703 NO. SECOND STREET, MINNEAPOLIS 11, MINNESOTA

face work and diamond drilling more field activity has been reported this summer than for many years past.

Meantime, the producers of both gold and base metals have been severely handicapped by the shortage of workers with the result that underground development has suffered and output has been reduced to the lowest point since before the war.

All these changes are recorded in the Handbook which, as usual, reviews the position of the operating companies in comprehensive detail, with five year comparisons of output, earnings and other essential information. Particulars are given of the active non-producing organizations, including office addresses, directors, capitalization, property holdings and current operations.

The Handbook lists 6663 companies and syndicates, as compared with 6300 in the 1943 edition. Part I gives the details on 810 active corporations, including approximately 300 formed in the past year, while Part II deals with 5853, most of which are quiescent.

For the market investor a long range table of quotations on The Toronto Stock Exchange, up to June 30, is provided, together with brokers' commission rates, government transfer taxes, etc.

The Canadian Mines Handbook is published by Northern Miner Press Ltd., 122 Richmond St., West, Toronto, Canada; price, \$1.

Rubber, Steel and Foundry Plants Get Top Priority Rate

Cleveland

• • • Twenty-one plants in the Ohio-Kentucky-Michigan region have been placed on the "must" list for top priority hiring, according to WMC here. These plants consist mainly of rubber, foundry, steel and ordnance plants. Special field recruitment crews have been established to force referrals of workers into these plants.

Efforts of referral hiring methods established here since July 1 are also showing results. Priority job placements in July led June placements by 47 per cent and May's by 78 per cent although still falling far short of needs. WMC's USES offices filled one-third of all the priority job openings filled. Yet only about one-fourth of the priority openings available was filled at all during May and June in the region. Active pressure to increase immigration of workers is anticipated here.

THE CONE AUTOMATIC MACHINE COMPANY



GOOD THINGS AHEAD

It is reported that

Instant-starting fluorescent lamps in a greater variety of shapes and sizes are promised after the war.

get ready with CONE for tomorrow

A laboratory model of an electron microscope has been made that fits into two suitcases and weighs 133 pounds.

get ready with CONE for tomorrow

One large processor of cereals intends to go into the manufacture of electrical appliances for use as premiums.

get ready with CONE for tomorrow

An aircraft manufacturing company has announced its intention of manufacturing washing machines and refrigerators after the war.

get ready with CONE for tomorrow

Natural gas is being frozen and stored for emergency use in one American city. It is believed possible to ship gas in this form from the oil fields to Eastern markets.

get ready with CONE for tomorrow

The American Petroleum Institute reports that proved reserve sources of crude oil are sufficient to meet requirements for "many generations".

get ready with CONE for tomorrow

A waterproof match has been developed for jungle use and should be a convenience to hunters, campers, and fishermen after the war.

get ready with CONE for tomorrow

The Navy is using concrete storage tanks for gasoline. Seepage is prevented by painting the inside with sodium silicate.

get ready with CONE for tomorrow

A new chromium plating salt is claimed to be more economical and non-poisonous.

One large manufacturer of automotive engines will have a lightweight, air-cooled, four-cylinder opposed engine, based on its aircraft engines, for low-priced, post-war automobiles.

get ready with CONE for tomorrow

A special new remover makes it possible to strip the paint from blacked-out windows with a hose and cold water.

get ready with CONE for tomorrow

A device, now being added to large radial aircraft engines, injects water into the combustion chamber for better cooling, less detonation, and greater fuel economy.

get ready with CONE for tomorrow

A new tool prevents wrinkles in pressed sheet metal.

The new 4.9 mile Chicago subway is the first section of a system of four units planned to include 55 miles of line and to cost 275 million dollars.

get ready with CONE for tomorrow

The Alien Property Custodian has granted licenses to use more than 2,500 of the 45,000 enemy patents that he is holding.

get ready with CONE for tomorrow

Ultra sound waves are being used to break the oxide layer from the surface of sheet aluminum before plating with tin.

get ready with CONE for tomorrow

A new electric motor weighing 7 pounds develops 3 horsepower at 120,000 r.p.m. and reaches full speed in less than a second.

get ready with CONE for tomorrow

One application of a new chemical insecticide to the walls of a room is said to continue to kill flies for three months.





*** 60% to 65%**
OF ALL LABOR COST IS
CHARGEABLE TO MATERIAL HANDLING

● At no time in history have production costs been so important. Smooth, swift production-flow means vital economies in time, space and man hours—and Logan materials-handling equipment is contributing these necessary production factors to industry throughout the nation.

Logan can assist you in your post-war materials handling problems. Orders for post-war conveyor systems are

being taken now and will be filled in order received as fast as peace production is resumed. Write us with regard to a preferred position on our post-war production schedule.

*Send for your copy
of this helpful book*



The Logan Co., Inc., 545 Cabel St., Louisville 6, Ky.

Logan Conveyors
PUT FLOW INTO PRODUCTION

Fairchild President Urges Two-Fold Plan For Postwar Aviation

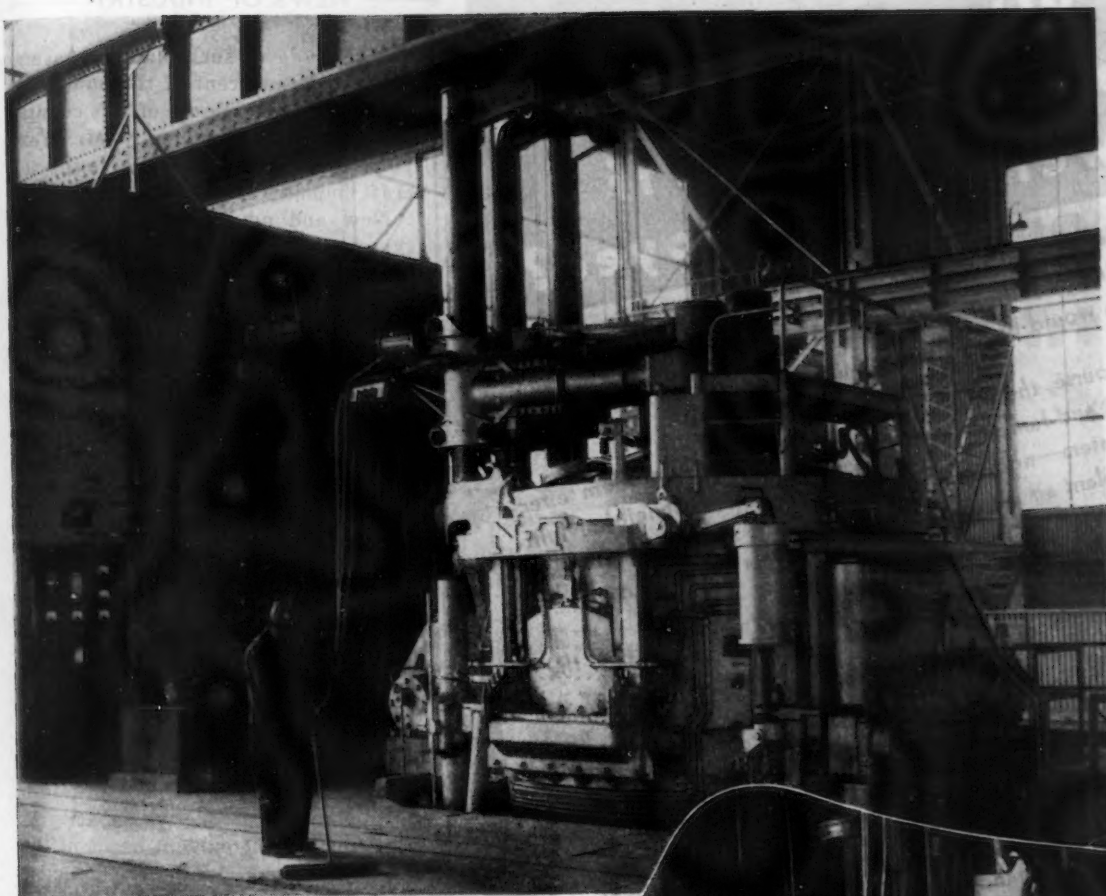
Washington

• • • J. Carlton Ward, Jr., president of the Fairchild Engine and Airplane Corp., in a recent testimony before the War Contract Subcommittee of the Senate Military Affairs Committee, laid down some proposals that might well seriously affect the postwar picture in aircraft construction. Basing his thoughts on the premise that military development in United States aircraft must not give way entirely to commercial enterprises after the war, he answered the committee's questions with respect to planning for national defenses postwar in aircraft. His plan is two-fold, involving research and development and standby aircraft construction capacity.

Mr. Ward proposes that present aircraft development contracts be continued rather than terminated after the war. Military research, design and development, he believes, should be continued on a constructive basis through competitive private industry. Along with this, a production program for the industry should be maintained to retain its ability to establish production processes and to permit air forces to familiarize themselves with

LIBERATION: Yanks and armored vehicles move into the French town of St. Gilles, following the liberation of the town during the current offensive in Normandy. Like its predecessors, the town offers a picture of gutted homes and general ruin, the result of shelling.





Lectromelt

**SELECTED FOR
ECONOMY...**

AND DEPENDABILITY

★ This recently installed NT Lectromelt, doing daily duty in a West Coast ingot mill, pours heats of 15 to 20 tons. It was chosen because of its ease of operation, economy and dependability.

By reducing the time between heats, Lectromelt's top charge features increase tonnage per man hour. Top charge type Lectromelt furnaces are designed to meet your needs for melting quality steels and irons. They are available in sizes ranging from 100 tons to 250 pounds.



MOORE RAPID
Lectromelt
FURNACES

★ ★ ★

**PITTSBURGH LECTROMELT
FURNACE CORPORATION
PITTSBURGH 30, PENNA.**

Where would YOU Choose to Work if You were an employee?

Logically you would be attracted to the plant with the best working conditions, since hourly rates, transportation and other factors would be pretty much the same.

Of course, the best working conditions imply modern effective dust and fume control as provided by the Schneible Multi-Wash System—not just a dust collector but a proved method of washing plant air to remove float dust, fumes and odors.

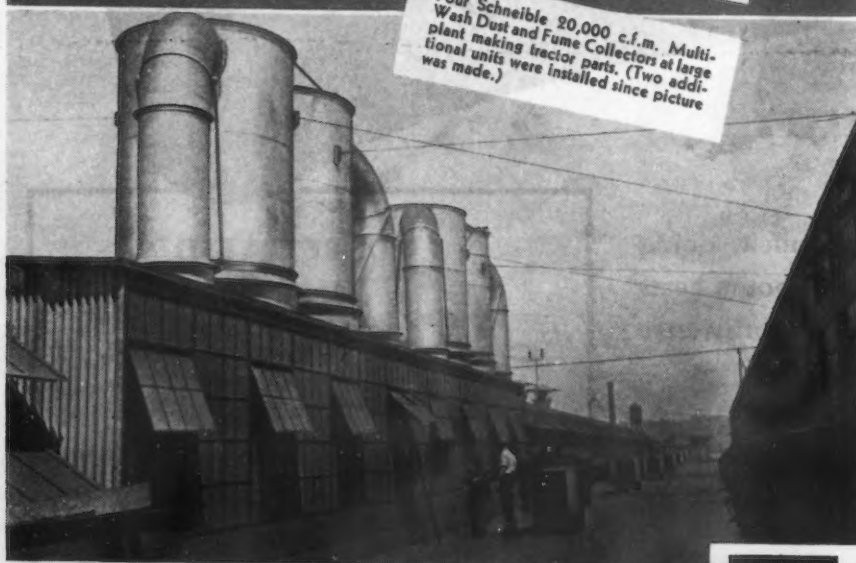
Besides its effectiveness, vouched for by scores of users, the Schneible offers several unique advantages: collected dust is converted to sludge; no dry dust to dispose of. There are no bags, screens or filters to shake, clean or become clogged—nothing to replace, burn or wear out—no dependence on "the human element."

Present-day operations favor plant modernization—foresight suggests plant improvements today so as to be in a position to meet the competitive demands of tomorrow.

Send for a bulletin picturing typical installations.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth Street, Detroit 16, Michigan

Four Schneible 20,000 c.f.m. Multi-Wash Dust and Fume Collectors at large plant making tractor parts. (Two additional units were installed since picture was made.)



SCHNEIBLE



the handling of such planes. Assuming that 20 per cent of the number of planes in the air forces of this country would be replaced annually, Mr. Ward points out that this would give the aircraft industry a basis for planning.

New and advanced models of all types of military aircraft required for a balanced air force should be designed and developed. Quality of product should be the primary factor in placing orders. While aircraft industries do not want subsidy, as under totalitarian governments, Mr. Ward suggests a National Air Power Policy that would allow the industry to maintain leadership in design and preparedness to resume large scale military aircraft production at any time it is necessary. In addition, such a policy assures adequate air protection at all times.

Air power presupposes several elements, among them airplanes, trained personnel, technical staffs, management and productive capacity, all of which are essential. To assure these, a strong industry must be maintained with operating productive capacity at least equal to the current needs of the armed services. Additional capacity, preferably through standby plants, should be available and ready as necessity arises.

Mr. Ward, in his testimony, pointed out that immediately prior to the entry of the United States into the war, this country was a third rate power in the air. This country had an under-nourished government facility at N.A.C.A., insufficient Army and Navy evaluation laboratories, and a lack of money for aircraft development contracts. Faced with a certain European war, it took first French and then, nearly a year later, British money to underwrite sufficient production for American aircraft factories so that the industry was able to accumulate personnel and facilities for the start on its subsequent expansion program. It is this type of occurrence that Mr. Ward warns against in the future, insisting that government insistence must be had for the development and research in military aircraft after the war.

Ease Equipment Regulations

Washington

• • • WPB has lifted restrictions on the use of auxiliaries and special equipment in the manufacture of turbines because the demand for steam turbines has greatly decreased. The restrictions were removed by revocation of Schedule VI to Order L-154.

"When I buy Salt I expect Service...

"Yes, Jim, I've gone through all that business of trying to follow my own formulas, or shopping around for the lowest price per pound.

"That didn't pay. You know as well as I do that although salt baths are an A-1 method of heat treatment, it takes experience to get the results you need.

"So I like to know that I can rely on the company that has had the longest and broadest salt bath experience. Houghton treats me right and its salts treat my steel right. Their men have pulled my shop out of trouble many times, so I'll continue to go along with them.

"You'll be playing safe if you do the same."

★ ★ ★

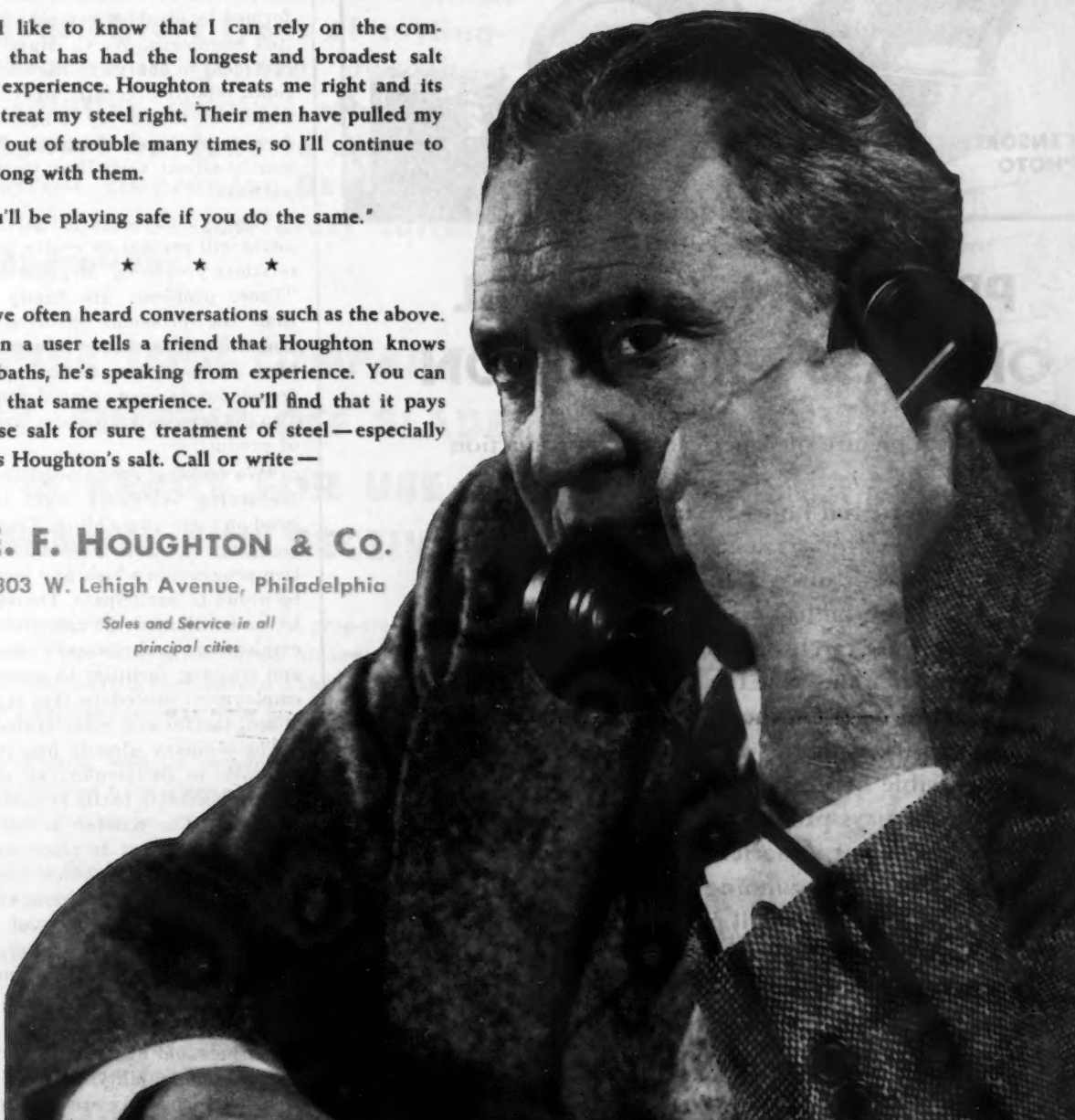
We've often heard conversations such as the above. When a user tells a friend that Houghton knows salt baths, he's speaking from experience. You can have that same experience. You'll find that it pays to use salt for sure treatment of steel—especially if it's Houghton's salt. Call or write—

E. F. HOUGHTON & Co.

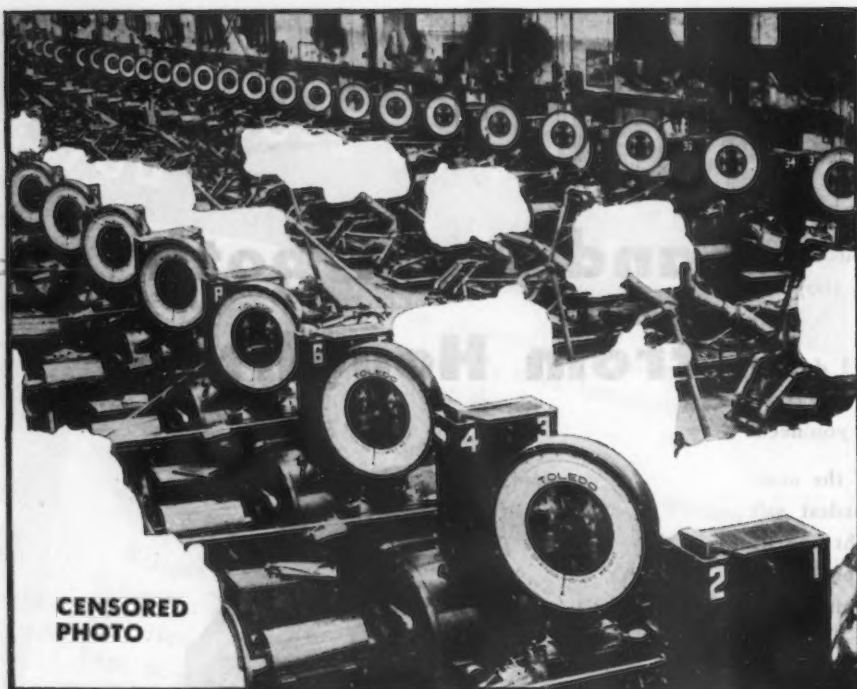
303 W. Lehigh Avenue, Philadelphia

*Sales and Service in all
principal cities*

**and I get both
from Houghton!"**



*Join the **SWING** to Houghton's Salts*

CENSORED
PHOTO

PRECISION CONTROL OF MASS PRODUCTION

Here is a picture of American mass-production at War.

The censored holes are internal combustion engines undergoing performance tests. This nameless plant turns them out like a machine-gun squirting bullets—almost.

The white circles are Toledo Dynamometer Scales, which measure the performance characteristics of each engine. There are 87 of these Toledo testers in this one Test Room—33 of them visible here.

This is mass production with precision control—the great American combination. It is proving to be the winning combination in this War of Machines. It will play a still greater part in our industrial progress when peace returns.

Toledo Scale Company, Toledo, Ohio.



Westinghouse Finds That Disabled Veterans Can Perform 83% Jobs

Pittsburgh

• • • Through experience employing physically handicapped persons during the war years, and plant-wide surveys in its 25 plants and 35 manufacturing and repair units the Westinghouse Electric & Mfg. Co., has learned that in some departments as many as 83 per cent of the jobs can be performed by disabled veterans with limited handicaps, W. G. Marshall, vice president in charge of industrial relations, reported recently. Westinghouse undertook the survey to help wounded former employees returning from the war to adjust their lives to a civilian pattern.

"The transition period from war to peace will present extensive industrial relations problems," Mr. Marshall said. "These problems are vastly greater than the problems involved in the transition from peace to war, for we have at once the demobilization of tremendously large armed forces and also the demobilization of a large army of production.

"We feel that everyone of these men (returning veterans) want to make good on their own ability. They do not seek charity, but they want a constructive program in which any man would be proud to participate. Therefore, we have coordinated the activities of our employment and medical departments and training facilities to assure a re-employment procedure that is personalized, tactful and considerate.

The company already has 1800 war veterans in its employ, all of them either disabled in battle or medical discharges. The number is increasing daily. In an effort to place such war veterans in jobs in which they show greatest promise of success, Westinghouse is making a special survey which, when completed, will show specifically each physical movement required in each of the hundreds of jobs done in the company's plants.

The personal qualifications of intelligence and stability required to do each job adequately are also recorded as accurately as possible. This "job-break-down" is so detailed that when it is completed a glance will be sufficient to tell whether a job requires a man with five fingers to do it, or whether it doesn't necessarily require any fingers.

Because this survey is still incomplete, Mr. Marshall said, Westinghouse

WHICH

CUTTING-OFF BLADE SHOULD YOU USE ?

The shaded areas in these illustrations of four types of cutting-off blades in general use show the relative amount of grinding that must be done to obtain the required clearances BEFORE any of the blades can start cutting-off operations.

EMPIRE TOOL COMPANY'S LUERS PATENTED CUTTING-OFF BLADE IS READY FOR USE the MINUTE YOU RECEIVE IT

By not requiring any grinding to prepare it for use, the Luers Type Cutting-off Blade presents an advantage of time-saving even before it starts working—and then it continues to save time as long as it is used.

Re-sharpening will be required only on the front face. Side and back clearances remain constant for the life of the blade.

Luers Type Blades are used on hand and automatic screw machines. Our engineers (located in principal cities) will gladly call at your request to assist you in simplifying your cutting-off operations—save time and increase production.

And now all these exclusive features
are also available in Cobalt Blades

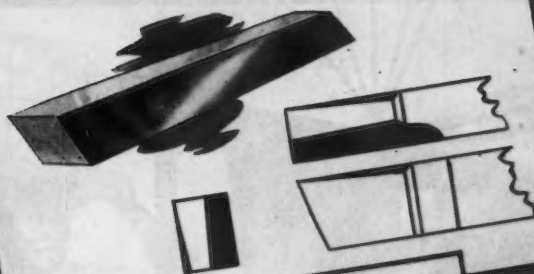
SEND FOR CATALOG

EMPIRE TOOL COMPANY MANUFACTURES LUERS PATENTED CUTTING-OFF BLADES
AND HOLDERS UNDER LICENSE ISSUED BY JOHN MILTON LUERS PATENTS, INC.

EMPIRE Tool Co.

8788 Grinnell Ave., Detroit 13, Mich.

FORGED TYPE



You must grind ALL clearances.

BEVELED TYPE



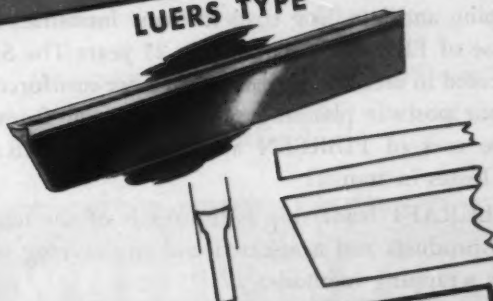
Beveled sides provide partial side clearances, but you must complete them and grind top.

CHANNEL TYPE



Some relief is provided by channels, but side and back clearances must be ground, along with front edge.

LUERS TYPE



No grinding necessary. Side and back clearances are all provided—and in addition, a hollow-ground top which causes chip to collapse thereby reducing friction.

BUY WAR BONDS

NEVER BEFORE HAS A WRAPPING MATERIAL WITHSTOOD SUCH PUNISHMENT



OFFERS A POSTWAR SERVICE ... BASED ON ITS AMAZING WARTIME RECORD!

Today, FIBREEN is protecting war supplies enroute to fighting fronts—assuring their arrival in usable condition despite direct exposure to wind, rain, sleet, salt water, arctic ice and tropical humidity. Those very same properties that make FIBREEN an essential war material are the ones you need to protect your postwar shipments from damage in transit and storage.

This Waterproof, Tear-Resistant, Fibre-Reinforced Wrapping Can Simplify Your Postwar Shipping

Shipping and handling costs in many industries have been reduced by the use of FIBREEN. For nearly 25 years The SISALKRAFT Co. has pioneered in methods of using sisal fibre-reinforced wrapping materials. In your postwar planning you may benefit from our long experience in the uses of FIBREEN and other SISALKRAFT products to reduce losses in transit!

SISALKRAFT leadership is the result of the unmatched performance of its products and a research and engineering service for developing better wrapping methods.



*Ask SISALKRAFT to help cut
your wrapping and shipping costs!*

*Manufacturers of SISALKRAFT, FIBREEN, SISAL-X,
SISALTAPE AND COPPER-ARMORED SISALKRAFT*

can place no definite limit on the number of jobs disabled veterans can do, but in some of the manufacturing divisions, where such a study has been completed, figures show that 83 per cent of the jobs can be done by men with only one eye; 82 per cent of the jobs can be done by men who are deaf; 19 per cent can be done by one-legged men; and 17 per cent of the jobs can be filled by men who must use a cane or crutches.

Since pre-employment physical examinations must be taken by all Westinghouse employees, whether they are returned veterans or civilians, the first hurdle which GI Joe must face on the road back to useful civilian employment is the plant's medical examination. If, for instance, the veteran is a former crane operator, but has lost his left arm, the doctor will recommend him for other work, perhaps as a production clerk in which he will use only his right arm and hand.

Having received the employment

SEA OF FUSES: An employee of the Westinghouse East Springfield Works examines fuses for 20-lb. Army fragmentation bombs. Installed on the noses of bombs, the fuses set the bomb's firing mechanism into operation only after they are dropped from the plane.



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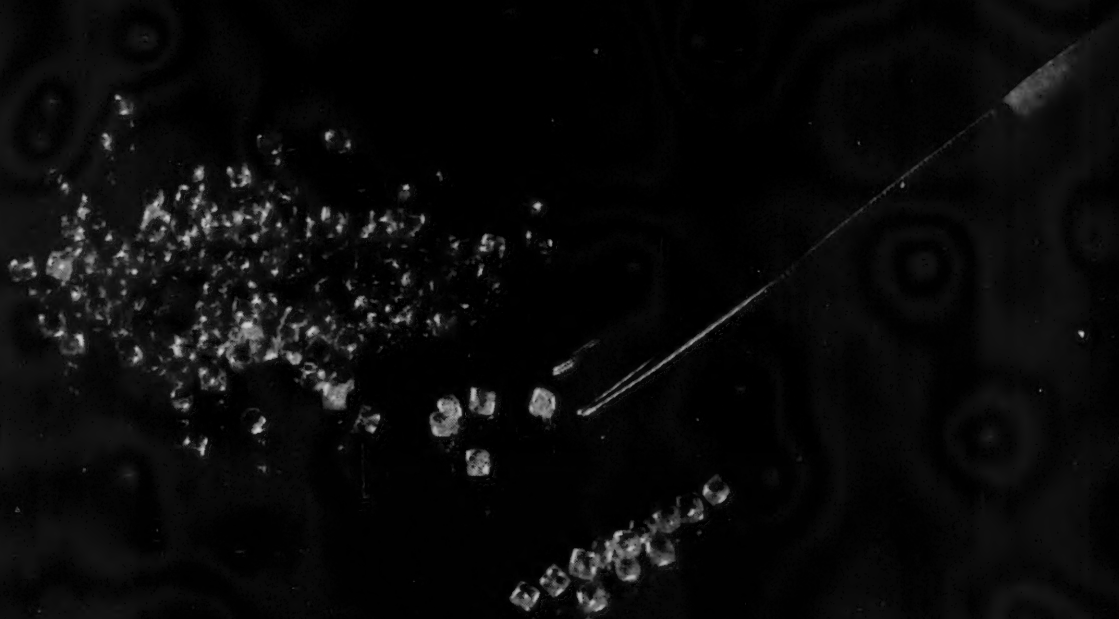
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LIKE TO PICK YOUR OWN

Diamonds?



Get a selection from Wheel Trueing's big stock . . . choose those you want and get exactly the kind of diamonds you prefer.

While the introduction of highly specialized engineered diamond tools (which Wheel Trueing pioneered) has done much to change buying habits, there are still plenty of diamond-wise production men, purchasing agents and heads of grinding departments who thoroughly understand the characteristics of diamonds, who are competent buyers and who still prefer to select unmounted stones.

Many of these experienced buyers have bought their diamonds from Wheel Trueing for a third of a century or more and in many instances leave the selecting of diamonds for their needs entirely in the hands of Wheel Trueing.

With Wheel Trueing sales offices located strategically throughout the country, it is an easy matter for us to get diamond assortments to you for your inspection and selection and you will find in every Wheel Trueing diamond assortment, the high quality that results in worth-while production economies.

Your inquiry will receive prompt attention.

Send for a copy of our booklet "Tips on Using Diamond Tools." You'll want copies for all your operators.

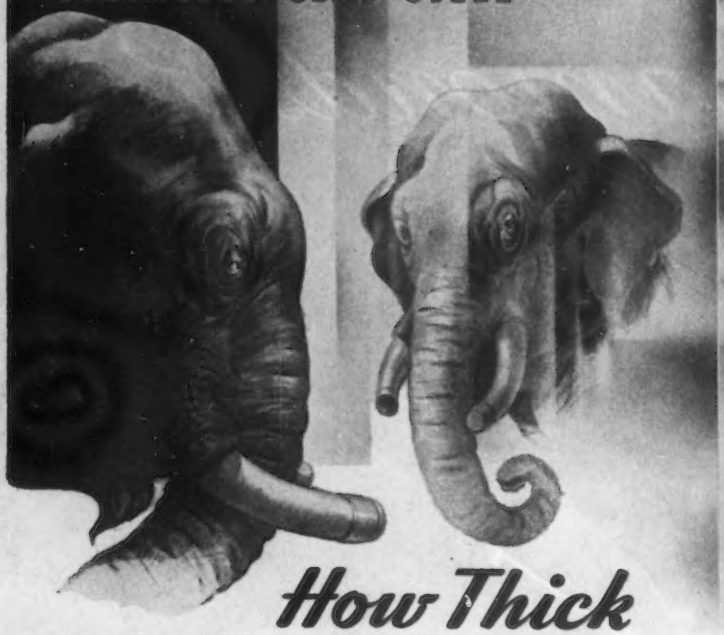
WHEEL TRUEING TOOL COMPANY

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Windsor, Ont. • Canada

INGACLAD

STAINLESS - GLAD STEEL



How Thick should an Elephant's Hide be?

**Thick enough to withstand
the attacks of its enemies...**

That's also true of your stainless equipment... Why pay for more stainless metal than you need? ... By using IngAclad you greatly reduce the material cost, yet have perfect stainless protection on the exposed surface... IngAclad consists of a 20% cladding of finest stainless steel bonded by the Ingersoll Process to a backing of mild steel.

If you are considering modernizing your plant with stainless equipment, be sure to investigate IngAclad... the only Stainless-Clad material with a 12-year record of satisfactory service in continuous use.

**Write for Special IngAclad Folder
and Manual of Fabricating and
Welding Procedure**

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BORG-WARNER CORPORATION

310 South Michigan Avenue

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Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

Also Producers of Ingersoll Solid Stainless and Heat-Resisting Steels

Users of IngAclad include:

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Groen Mfg. Co.
Leader Iron Works
Monsanto Chemical Co.
Procter & Gamble Co.
Sherwin-Williams Co.
Solvay Process Co.
United States Potash Co.
Whiting Corp.
and many others

manager's and medical examiner's approval on his physical condition. the disabled veteran is then examined to see if his psychological assets are of the type for which the job calls. Once past both the physical and the psychological tests and assigned a position in one of the company's plants, special training is available to prepare him for his work.

"Job placement is a continuous growing thing," according to W. L. Hitt, coordinator for veteran placement at the East Pittsburgh headquarters of Westinghouse. "It is impossible to set up a static list of 'can do' and 'can't do' jobs because so many factors concerning both the job and the man must be considered."

Pointing out that blind men are now doing excellent work on jobs which a few years ago would have been thought impossible for them, Mr. Hitt said: "This is but one example of how necessity gives the opportunity to industry to find jobs for men who were at one time known as 'unemployables.' And a chance is all many men need for success.

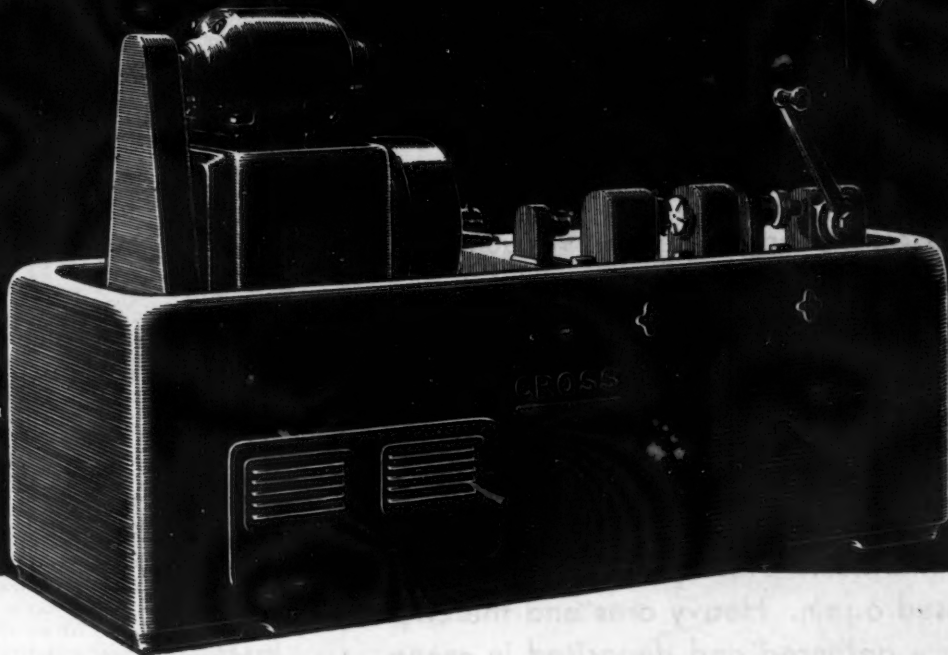
"The quality and quantity of the work accomplished by veterans of this war is pretty much in line with the extent of their physical and nervous disabilities," Mr. Hitt said. "Battle action veterans are doing a real job in spite of their handicaps, but I think it unwise, if not foolhardy, to assume, forthwith, that a man who has, say, lost an arm or suffered some other physical impairment in the war could meet his old production rate."

A Veterans' Committee, which claims to be the first of its kind known in the United States, was recently organized at the Radio and X-ray divisions of Westinghouse at Baltimore. Its chairman, E. L. Roberts, who participated in the North African campaign, says that all World War veterans who work at the Baltimore plant are members of the committee.

The chief purpose of this organization is to help in the rehabilitation of the returning war veterans, not only in the plant, but also in their personal lives. The committee also assists in domestic and financial problems during the period of readjustment. Formed in March, 1944, the committee is strongly supported by management in the Baltimore plant.

"The committee relieves the foreman of the task of hearing problems and personal worries of returning veterans by listening to them itself," Mr. Roberts explained. "Then if the committee decides that the veteran's work is a contributing factor to his problems, it

and HERE'S WHAT HAPPENS *Automatically -*



● Clutch Housing Bored and Faced

● Center Main Bearing Milled on Both Sides

THIS CROSS SPECIAL MACHINE, by means of three independent but simultaneous feeding motions, straddle mills the center main bearing of an automotive cylinder block, and bores and faces the clutch housing—at the rate of 30 pieces per hour at 80% efficiency.

More than that, this machine enables inexperienced or unskilled operators to maintain close tolerances. The work cycle is fully automatic and functions without attention. Labor costs per piece are low. Large-volume production is obtained from a small floor area. Cutter breakage and scrap losses are minimized by means of interlocking electric controls.

Milling, facing and boring are thus combined into one fully automatic operation on a Cross Special Machine that *anyone can operate.*

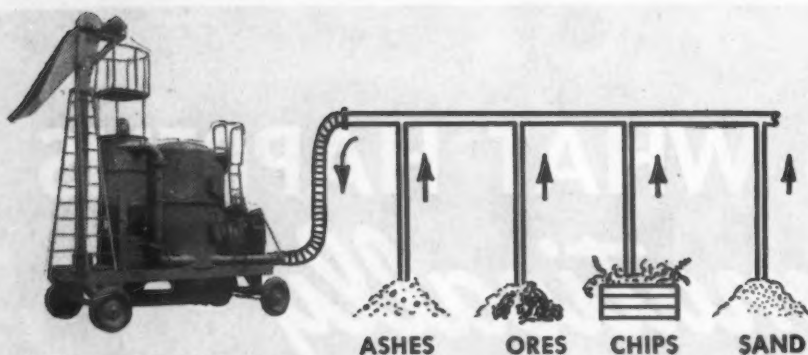
The idea behind the design of this machine is the idea behind all Cross Special Machines... removal of metal at lower cost on equipment that operates at the push of a button. It is a principle that can be applied to any type of machining operation, a principle that is in successful use all over the world.

Cross Engineers are available to survey your present machining methods and, if special machines can lower your costs or help solve your manpower difficulties, they will design, build and install the machines for you, and show your workmen how to operate them.

The new Cross Catalog contains 38 detailed case histories of successful Cross Special Machines. For your copy, write on your letterhead to The Cross Company, Detroit 7, Michigan, Department 22.

Special Machines •

for automatically performing any one or a combination of metal cutting operations
TURNING • MILLING • DRILLING • BORING • REAMING • TAPPING • GRINDING



VACUUM *is now*

THE BIG CONVEYOR

Instead of ounces and cubic feet, the material which can now be removed by large Spencer Vacuum units is measured in tons and carloads.

In a steel mill, the Spencer Portable shown above removes the fly ash from the checkers of an open hearth and deposits it in a car for disposal at savings of hundreds of man hours. Blasting sand, used in ships for cleaning before painting, is removed by lowering a vacuum line into the hull. Glass and foundry sand is recovered and used again. Heavy ores and the chips in metal plants are gathered and deposited in receptacles for convenient disposal.

Vacuum is a tool, like compressed air, except that it does not spread dust but collects the materials for easy salvage, sorting or removal.

Every plant can use Spencer Vacuum in a dozen ways—from stock room to bench work, assembly, painting and final inspection. It cleans floors, walls and ceilings as an extra dividend.

Stationary units can be piped to any part of the plant or Spencer portables from 1½ H.P. up can be moved easily from room to room.

Ask for bulletins.

SPENCER VACUUM
HARTFORD
CLEANING
THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

recommends to the plant superintendent a change of occupation within the plant and the man is transferred," he added.

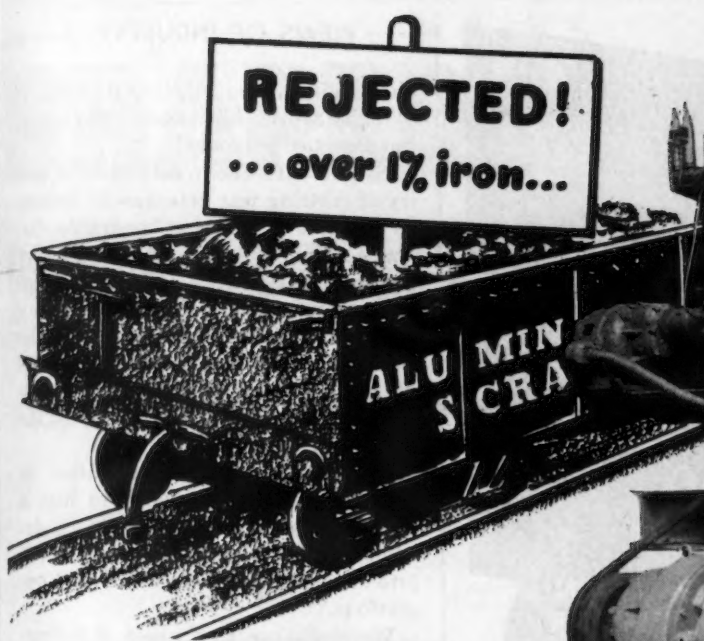
One of the reasons why Westinghouse feels competent to handle disabled war veterans in its plants is because of the company's long previous experience with handicapped workers.

Handicapped persons, by the very reason of their handicaps, are more careful and take fewer chances than do normal persons, it has been found. Handicaps reduce absenteeism and these people take unusually good care of their health. Also, it has been observed that the handicapped are usually first to work, stay at their benches longer and are last to leave, probably because of their disabilities they find it more convenient to avoid crowds.

In the Westinghouse Steam division at South Philadelphia, 171 physically handicapped workers are engaged in almost every type of manual or machine operation and an industrial relations report indicates that "all are successful." For the past nine years

BEAUTIFUL BUT DUMB: *The sculptured agony on the face of this statue could well be taken for a commentary on the havoc wreaked by war. Debris litters the stairway and grounds of a stately French chateau in Normandy, seized from the Nazis by advancing Allies.*





DON'T "Pay the Freight" on Scrap that won't pass!

If you are selling aluminum scrap it will pay you to buy the most efficient magnetic separator available. WLB permits smelters to reject entire shipments of scrap containing more than 1% iron. What's more, if you get all the iron out you get almost double the price for your scrap. For example, with pure aluminum chips selling at 3.5 cents per pound, those containing 1% iron are 1.8 cents per pound. On this basis a small Dings Separator with a capacity of 2000 lbs. per hour would make \$34.00 per hour while operating.

There is a complete line of high intensity Dings Separators for every scrap separation job. The unit illustrated is the latest word in high capacity units. Write today for data, outlining your requirements.

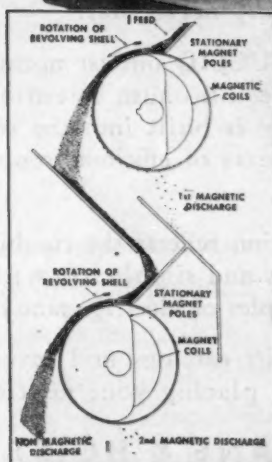
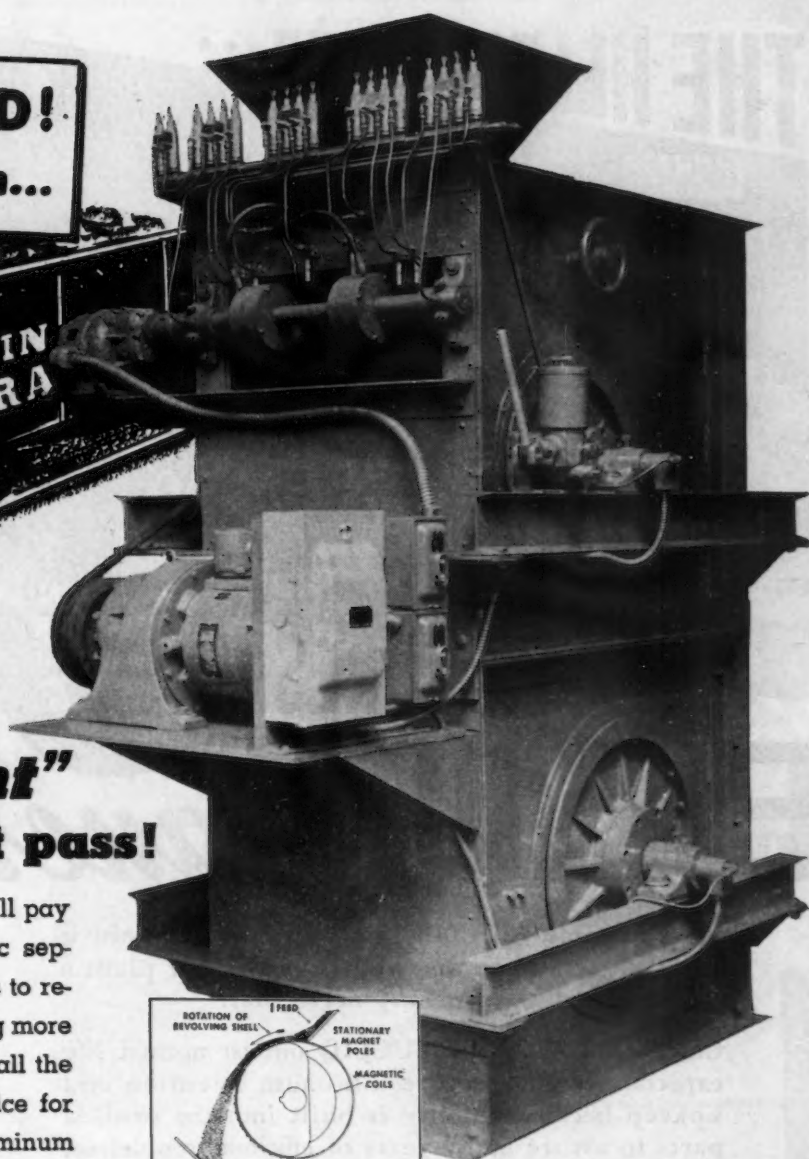
Dings Magnetic Separator Co.

516 E. Smith St., Milwaukee 7, Wis.

World's Largest Exclusive Builder of Magnetic Equipment

Dings
MAGNETIC
SEPARATION

HIGH
INTENSITY



NEW

The Dings Double Drum Separator illustrated above is a new, improved model offering many advantages for sharp, clean cut separation, includes a new, positive, forceful lubricating system and other features. Complete specifications on request.



Left — Alnico Horseshoe Magnet. Very powerful. 2 1/2" high, 3" wide x bases 3/4" x 3/4".

THE HELPING HAND...



EUCLID
CRANES HOISTS

THAT NEVER TIRES!

WE CAN
DELIVER

a limited number
of 5 to 10 ton
cranes in 60
to 90 days

EUCLID *Cranes*

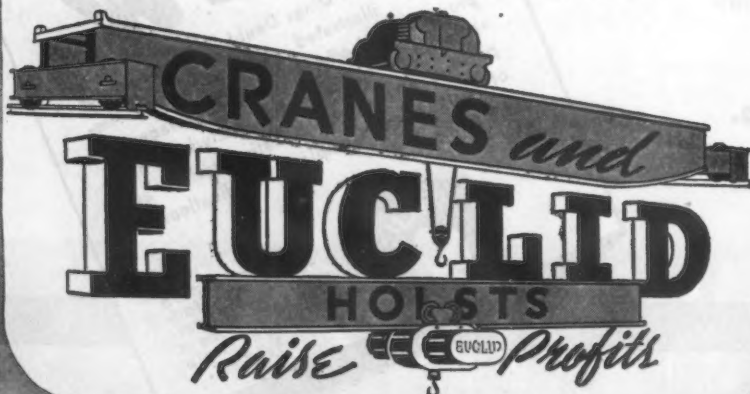
● The name "EUCLID" on your crane or hoist is positive assurance that you have in your plant a helping hand *that, literally never tires!*

Cranes and Hoists by EUCLID outlast normal life expectancies and require minimum attention and upkeep because quality is built into the smallest parts to assure many years of efficient troublefree, economical operation.

Every detail of construction reflects the combination of traditional ruggedness and simplicity, with perfected and proven principles of electric crane design.

Write for Crane or Hoist catalogs and investigate Euclid equipment before placing your next order!

THE EUCLID CRANE & HOIST CO.
1361 CHARDON RD., EUCLID, OHIO



NEWS OF INDUSTRY

the Trafford, Pa., Printing division of Westinghouse has been employing handicapped personnel.

In line with the Westinghouse policy of rehiring war veterans as quickly as possible after their honorable discharge from the various branches of the service, D. C. Lee, Industrial Relations manager of the Baltimore plant, has written to the draft boards in the Baltimore area inviting them to send all war veterans with honorable discharges to the Westinghouse plant for interviews.

In his letter Mr. Lee promised to give each man who comes to him a thorough interview "in order to develop any possibilities of his fitting into our manufacturing or clerical operations."

Westinghouse, as a whole, is following a plan aimed at giving the service-

DEATH PATTERN: A worker fashions a pattern for death for the enemy in this row of shiny, precision-finished breech cases getting a final "facelift" at the Center Line Ordnance plant, operated for the Navy by the Westinghouse Electric & Mfg. Co.



SHAPED WIRE FOR MANY NEEDS

FROM COTTER PINS TO---



★ Wire drawn to special shapes has an important place in modern production. It adds to the utility and appearance of many products, cuts manufacturing costs, and frequently saves valuable production time.

Continental offers a special service in shaped wire. Continental wire, to fit particular needs, can be supplied to manufacturer's specifications in a wide variety of shapes, sizes, and tempers (no cross-sectional dimension to be greater than $\frac{1}{2}$ inch). Many different finishes and coatings also available.

If you have use for shaped wire, you are invited to take advantage of Continental's experience in developing manufacturers' wire for special jobs. Write or wire today.

CONTINENTAL STEEL CORPORATION, KOKOMO, INDIANA

(The Superior Sheet Steel Co., Canton, Ohio—A subsidiary)



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PRODUCERS OF— SHEETS: Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terno, etc.
WIRE: Bright Basic, Annealed, KONIK, Coppered, Tinned, Special Manufacturer's, etc.
Nails, Staples, All styles of fence, Gates, Steel Roofing, other steel products.

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Tool Completely for War Production and Be Completely Toolled for Post War Competition

With the correct ARMSTRONG TOOL HOLDERS you can greatly increase (often double) speeds and feeds of every operation on lathes, planers, slotters, shapers, turret lathes and screw machines—and materially increase the output of war materials and help speed victory.

With the same ARMSTRONG TOOL HOLDERS you will be prepared to instantly start on your postwar program, once victory is won, for each is a permanent, multi-purpose tool that does the work of a complete set of forged tools—that reduces tooling-up to the selection of a cutter and tightening of a set screw—that "Saves: All Forging, 70% Grinding, and 90% High Speed Steel."

Equip all machine tools with their complete complement of ARMSTRONG TOOL HOLDERS now, to increase war production, and to be ready for postwar competition.

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"The Tool Holder People"
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Eastern Warehouse & Sales
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ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

NEWS OF INDUSTRY

man working for the company every opportunity to work at his maximum efficiency. Organized by Mr. Marshall, this plan embraces the following points:

1—Making an industrial relations representative responsible for re-establishing returning veterans.

2—Surveying all positions in all plants.

3—Designating a physician to be responsible for all physical examinations of returning veterans and to supervise special medical attention for disabled veterans.

4—Assuring continuous service credit for the time spent in the armed forces by employee veterans.

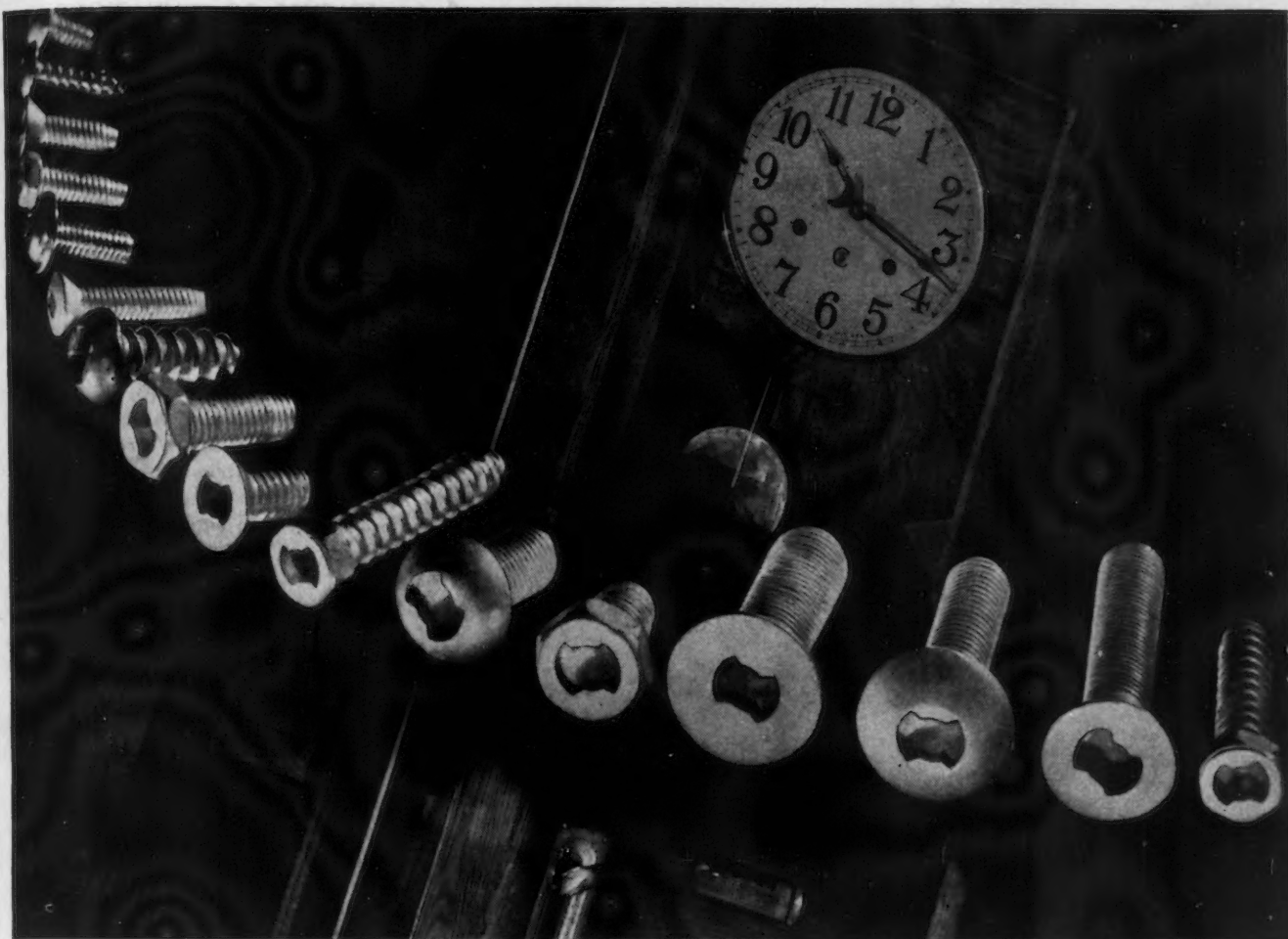
5—Making every effort to find jobs quickly for returning employee veterans who are able to work.

6—Maintaining close contact with local and state agencies involved in the welfare of returning veterans.

Permeable Refractories For Gas Fired Furnaces

[CONTINUED FROM PAGE 72]

of furnace would achieve notable savings in fuel. The cellular nature of the material, approximately 1000 sq. ft. per cu. ft. of material, presents a vast surface area over which heat transfer can take place. Thus the temperature of the outgoing gases at any point in the wall is likely to be the same as that of the material of the wall. Major heat losses are (1) the loss of heat in the products of combustion leaving the furnace, and (2) the heat conducted away through the furnace wall. Considering in what may be called the "conventional" furnace, a chamber with an internal wall temperature of t_1 deg., the gases will leave at or above t_1 deg., and this temperature governs the heat lost in the flue gases. In the permeable refractory furnace, the gases escape at a lower temperature t_2 deg. (which is that of the outer side of the permeable furnace lining) due to having given up additional heat to the brick while passing through the wall. Thus the loss of heat due to the temperature of the products of combustion is reduced. The second source of heat loss is by conduction through the furnace wall. Again, the temperature of



You Can't Argue with the Clock

Time is adamant. It measures the output . . . *and the cost* . . . of production. For several definite and easily provable reasons you will find that CLUTCH HEAD Screws pace Assembly Line production at every step.

The testing and proving of these time-saving features . . . plus others that contribute to smoother, safer operation and lessened fatigue . . . may be done right at your own desk. To this end, your request will bring you, *by mail*, a package assortment of CLUTCH HEAD Screws and sample Type "A" Bit, along with fully illustrated Brochure.

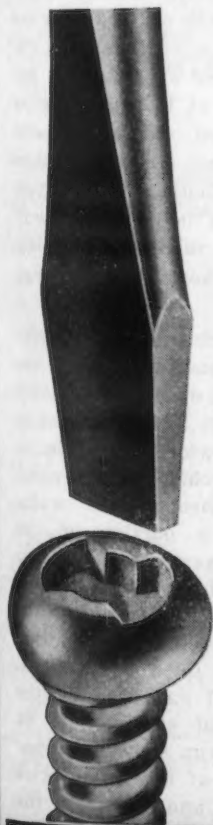
Your own appraisal will show you that this modern screw has advanced engineering design to challenge the march of production time; that it has everything . . . **AND MORE** . . . offered by any or all other screws on the market . . . explanation enough why CLUTCH HEAD is accepted as "The Screw That Sells Itself."

You may order CLUTCH HEAD Machine Screws in regular and thread-forming types. Production is backed by this organization and by responsible Licensees.

Check the perfect operation of this screw with an ordinary type screwdriver, or any flat blade, of proper width. This exclusive CLUTCH HEAD feature has proved its value in war and peacetime service.



This rugged Type "A" Bit is restored to its original high efficiency by a 60-second application of the end surface to a grinding wheel. No delay. No expense. No "back-to-the-factory" shipment for reconditioning.



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*in your
Lathes and
Grinders*

... help sustain high production,
and precision

Kennametal centers outlast high speed steel centers 50 to 100 times, because the nib is made of special, very hard, non-galling grade of carbide. Increased production rates can thus be sustained—jobs keep turning on Kennametal centers, while steel centers are being removed for grinding many times—40, 50, or even 100.

Chatter due to center wear is eliminated and accurate machining thereby maintained. Costs are reduced—fewer centers need to be reground—less idle time of machine and operator for replacements.

The unique ability of Kennametal centers to keep work running true makes them well suited for precision jobs on grinders, and, when teamed with Kennametal lathe tools, they help to assure such accurate turning that grinding operations can often be eliminated.

Kennametal centers are stocked in standard sizes—Morse, Brown & Sharpe, and Jarno tapers. Separate, accurately molded nibs are available for those who wish to make their own centers. Catalog 44 describes them. A copy is yours for the asking.



◆ FEATURE CONTINUATIONS ◆

the outside of the wall will be t_2 deg. for the permeable furnace, and this will be higher than the temperature t_3 deg. with the conventional furnace; thus less heat is lost by conduction through the furnace wall.

In addition to its possibilities in saving fuel, this new design offers important possibilities in the uniform heating of furnace chambers. There must be inequalities in temperature in the conventional furnace where gases are burnt at one place and the products of combustion leave at another. It is, moreover, often difficult to avoid dead spots where the gases do not circulate freely and the temperature is consequently lower than elsewhere. This furnace makes it possible to operate with a positive pressure throughout the furnace chamber and to withdraw the gases uniformly over the whole surface, so that the furnace chamber can be filled with flame. With the normal flue construction, it is difficult to work furnaces under pressure.

Several of these furnaces described by the authors have been in industrial operation over an extended period. The results fully bear out the deductions drawn from theoretical considerations, and the behavior of the furnaces has been highly satisfactory. A small crucible metal melting furnace working at low temperatures, for example, showed over an extended period a fuel saving of 15 per cent over an orthodox furnace used for the same purpose. In the same pair of furnaces a no-load test showed a saving in fuel of 58 per cent with the permeable wall furnace. Another successful application has been for heating galvanizing baths.

A mechanically charged furnace for annealing steel castings which has been in continuous operation for over 12 months measures 7 ft. 6 in. back to front, 3 ft. 9 in. wide, and 22 in. to the crown of the arch. The waste gases are withdrawn through the walls, back, arch and a portion of the hearth, the necessary suction being applied by an exhaust fan. Records kept during 57 consecutive runs showed an average fuel consumption of 1.25 cu. ft. of town gas per lb., which included all gas used on the furnace—a thermal efficiency of 44 per cent, the best run showing 56 per cent. No clogging of the refractories had been observed, and in spite of the severe conditions to which the furnace was subjected, there had been no spalling and very little cracking of the lining. These conditions involved

62,640,000 PRODUCTION HOURS!

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"VISI-MATIC"
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SINGLE HEAT
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Welding Service Range Ratings are based upon actual delivered output of usable welding current.

Proved- for Lower Welding Costs

Here's an amazing record of performance, set up in five short years by thousands of these Square Frame Welders. More than 62 million production hours . . . in all kinds of plants . . . in all types of metal fabrication . . . have proved the stamina of these machines where round-the-clock schedules demand the utmost in service.

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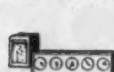
What this remarkable machine has done in thousands of other plants, it can do in yours—to help cut welding costs and speed production. Ask for full details about this P&H Welder.

Ask also for full information about P&H Welding Electrodes for all kinds of production, maintenance and repair work.



A COMPLETE ARC WELDING SERVICE

DC WELDERS AC WELDERS WELDING ELECTRODES WELDING POSITIONERS PRODUCTION CONTROL SYSTEMS



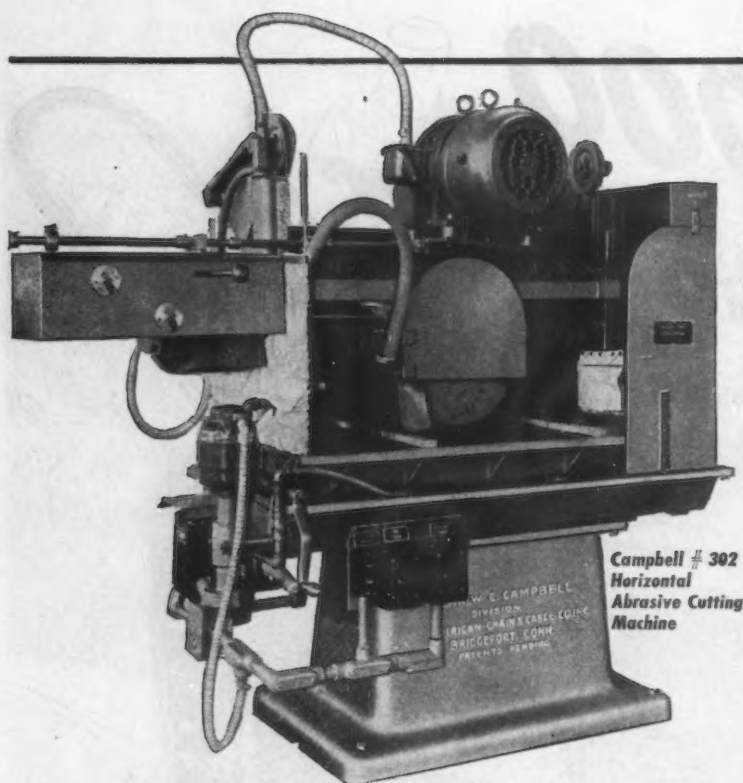
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Horizontal
Abrasive Cutting
Machine**

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• If you cut any of the annealed or unannealed steels, non-ferrous alloys, plastics, glass or ceramics—solid bar, tubular or flat stock—a CAMPBELL ABRASIVE CUTTING MACHINE will help you. • Tell the CAMPBELL Engineering Department materials, shapes, sizes, lengths before cutting, lengths of cut off pieces and hourly production required. They'll give you cost data and production procedure without obligation. Ask for a copy of the CAMPBELL ABRASIVE CUTTING CHART. It shows how the CAMPBELL complete line of Abrasive Cutting Machines can be used to open the way to new highs of production and new lows of cutting costs.

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AMERICAN CHAIN & CABLE COMPANY, Inc.
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FEATURE CONTINUATIONS

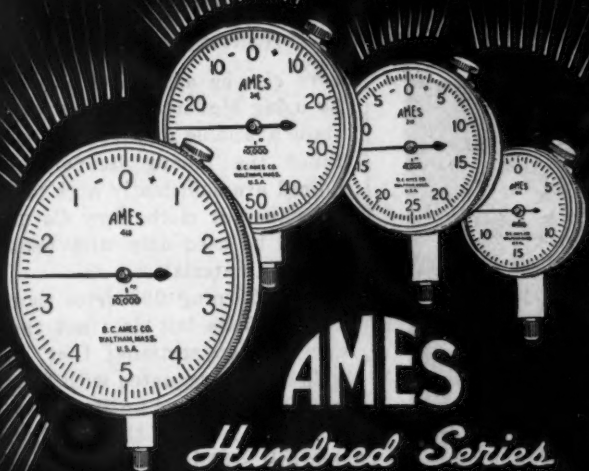
rapid heating up from a cold start with no load on the furnace; the castings were then charged and brought up to 1652 to 1742 deg. F. and soaked; they were then withdrawn and a fresh charge immediately inserted. An interesting feature is the speed with which these furnaces can be heated. After a week-end shut-down, that is, with a cold start, this furnace is ready for charging after gas has been on for only 17 min.; the same condition can be obtained in 7 min. after an overnight shut-down.

A bogie hearth annealing furnace due for rebuilding was adapted to permeable linings. This furnace was of the single-door type, having two bogies for alternative charges, each having an effective area of 5 ft. x 3 ft. wide. In this furnace permeable tubular blocks were used to give a mechanically stable structure while avoiding joints that might cause short-circuiting. This furnace was designed to anneal miscellaneous steel castings, each bogie load weighing 30 cwt. The castings were to be heated to 1688 to 1742 deg. F., held there for 5 hr., cooled in the furnace to 1112 deg. F., and then withdrawn, after which a new charge was inserted. After over six months in operation it can be said that this furnace is entirely successful, and shows a thermal economy over the individual consumptions of other bogie hearth furnaces in the same works of 35 per cent, these figures being based in each instance on the performance of the comparison furnaces when new.

Summary

To sum up the conclusions so far reached as the result of considerable experience, it would seem that with lower furnace temperatures such as 932 deg. F., the permeable wall construction will save about 10 per cent of the fuel. With higher temperatures of 2552 deg. F., the savings are likely to be about 40 per cent. In general the maximum suitable temperature at present is about 2372 deg. F., because of the limitations of the refractories. The principle is not of universal application, again because of the properties of permeable refractories. These refractories are not resistant to fluxes, and could not be used for direct melting. They would not be recommended for forging furnaces since the iron oxide scale would soon cause trouble for the same reason. There is, however, a large number of processes conducted between 932 deg. and 2372 deg. F., which appear to offer a wide field for immediate development.

4 Sizes ~ 1/4 Dial Faces



AMES Hundred Series DIAL INDICATORS

In four sizes with fourteen different dial graduations, indicating thousandths, half-thousandths or tenths of thousandths inches.

Speedy, accurate, inexpensive and adaptable to various measuring and testing jobs.

Write today for catalog.

FAST • ACCURATE

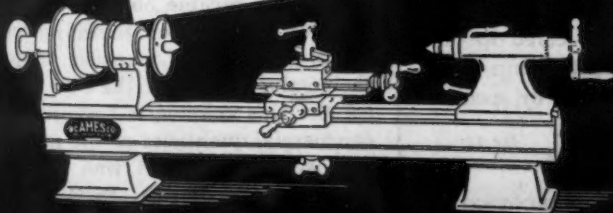


AMES No. 13 COMPARATOR FOR QUICK COMPARISONS

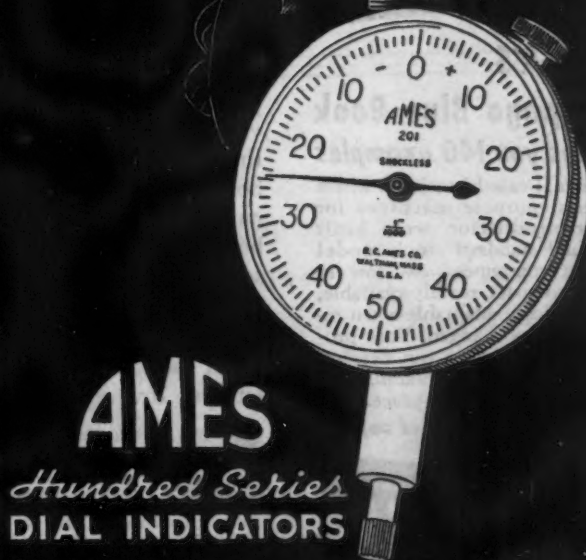
AMES Precision BENCH LATHE

Known for 40 years as a precision lathe of the highest quality. Bed 36" long. Ball bearing headstock uses 1" capacity collets. Swing 8 3/8" over bed. Available with motor drive.

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Shockless
in
Four Sizes



AMES Hundred Series DIAL INDICATORS

B.C. AMES CO. WALTHAM, MASS.

Production
time cut
83 $\frac{1}{3}$ %

This special machine faces, drills, and taps equalizing beams for rear-axle assemblies on trucks.

..by using standard,
low-cost **DELTA**
DRILL PRESS units to build this
dependable special-purpose machine



DELTA'S
76-page Blue Book
gives you 140 examples

—actual case histories in which special-purpose machines for war production were built around standard stock-model Delta components — low in cost, compact, readily available, and quickly adaptable when requirements changed. Your production engineers can develop similar ingenious combinations in reconvertng for peace.

Write for your free copy.



Reducing a 90-minute operation to 15 minutes is typical of results in hundreds of plants which have employed this modern approach to tooling — without the delay and investment risk involved in buying costly, cumbersome, inflexible special machines.

The combination of standard Delta units and American ingenuity is unbeatable because Delta's savings in cost, weight, and space are not obtained at the expense of dependable accuracy. They result from advanced design — quantity production with the latest precision equipment for diamond-boring seats, precision-grinding shafts, dynamically balancing pulleys, pre-loading ball bearings — quality features such as double-sealed New Departure ball bearings.

You too can mechanize complicated operations quickly with a small outlay. Equip with Delta tools — in units, batteries, or special set-ups. Investigate!

MA-11

THE DELTA MANUFACTURING CO.
705K E. Vienna Ave., Milwaukee 1, Wis.

Please send me my free copy of your new 76 page Blue Book and catalog of low-cost Delta Tools.

Name.....Position.....

Company.....

Address.....

City.....(.....) State.....

FEATURE CONTINUATIONS

Heat Resisting Resins

[CONTINUED FROM PAGE 81]

cure can be accelerated considerably by using higher temperatures such as those available in wire bonding ovens. Since the curing temperatures required are sufficiently high to carbonize paper or cloth, Dow Corning 993 should be used only with heat stable spacing materials.

Dow Corning 993 dries thoroughly in thin films but does not thoroughly dry in deep sections; that is, when coils are impregnated with Dow Corning 993 and baked until the surface is hard, the resin in the interior of the coil will still be capable of softening at high temperatures. Therefore, it is not recommended for applications such as high speed armatures in which the impregnant is required to hold conductors rigidly in place against the effects of extensive centrifugal forces at elevated operating temperatures. Dow Corning 2052 should be used for this type of service.

Electrical properties observed as results of tests made on 4 mil Fiberglass cloth coated with Dow Corning 993 to an overall thickness of approximately 7 mils and cured until tack free are as follows:

Power factor at 1000 cycles, per cent	0.30 to 0.70
Dielectric constant at 1000 cycles	3.0 to 4.0
Dielectric strength, volts per mil	1500 to 2000

The commercial availability of the Dow Corning Silicones in their various forms is the culmination of years of research by chemists and technologists of the Corning Glass Works and the Dow Chemical Co. In the case of the fluids, they were developed by Corning's research group at Mellon Institute. But the fundamental work on the structure of these materials and the development of electrical insulation was first done at Corning's research laboratories.

When it became obvious that substantial amounts of these materials would be required in order to prove their value, the aid of the Dow Chemical Co. was enlisted to produce semi-commercial quantities of the products. The work at Midland was conducted by a group under Dr. E. C. Britton, director of Dow's organic research laboratory. To meet the requirements of the war effort for some of the Silicone products, it was decided by Dr. W. H. Dow, president of Dow, and Glen W. Cole, president of Corning, that a company should be formed for the manufacture and development of these products. In February, 1943, Dow Corning Corp. was formed.



The room without any chairs

You are not left to cool your heels in the outer office when you come to do business with Bristol Brass. For Bristol executives do not waste your time any more than their own . . . or any more than man-hours in the mill. So you're never told here that: "You'll have to wait." You either see your man right away, or you're told exactly when you *can* see him. And when you do, there is no time lost

in getting down to brass tacks.

This is no wartime innovation at Bristol. It's been this way for nearly a century. Bristol's philosophy has always been that a compact, uninflated organization . . . accustomed to move and think fast, without hindrance of buck-passing formality . . . can get more done, get it done *faster*, and more accurately.

It's a lot easier, more satisfactory, and more enjoyable to do

business this way . . . as our good friends of long standing all agree. And what's more, it's the surest preventive known against elephantiasis of the ego, and hardening of the arteries of the brain.


The BRISTOL BRASS CORPORATION

Makers of Brass since 1850 • Bristol, Conn.

★ BUY BONDS TO BUY BRASS FOR BULLETS ★

CLARK

BOLTS

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as
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STAMINA-
and
100%
on the Warpath

CLARK BROS BOLT CO.

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SINCE

1854

NEWS OF INDUSTRY

Again Rank Steel Industry As Third Safest Major Industry

New York

••• In spite of difficult conditions which included a high turnover rate among employees, the steel industry held fast last year to its high rank in safety, according to the American Iron and Steel Institute, quoting latest annual statistics of the National Safety Council.

As in 1941 and 1942, the steel industry last year was the third in freedom from accidents among leading industries. Only the communications and electrical equipment industries among 38 major industries stood above steel in safety last year.

The 1943 accident frequency rate in the steel industry was 7.4 per million manhours worked, the same as in 1942. The average for all industries was 14.5 last year, compared with 14.9 in 1942.

In 1934 steel ranked 12th in safety. By 1936 it had achieved sixth place, in 1940 it ranked fourth and since 1941 it has ranked third.

So many persons were hired as replacements in 1943 that a resultant increase in accidents might have been expected in the industry. At the same time, steel plants were operating at high speed to set an all-time record for yearly tonnage output, another obstacle to safety which had to be overcome.

The new employees hired to fill the jobs of workers who had entered the armed services were unfamiliar with their surroundings, but safety engineers and departmental officials conducted an unrelenting drive against unsafe practices and saw that every newcomer was adequately instructed. In one month alone, toward the end of the year, the industry hired around 17,000 persons for hourly, piecework or tonnage work.

Curiously, the women followed safety rules more closely, with fewer accidents being their reward, than the men hired as replacements, according to a safety engineer for one of the steel companies.

Larger and More Costly Portable Tools Being Sold

Washington

••• Larger and more expensive portable pneumatic and electric tools are being sold and shipped in increased quantities, the WPB Tools Division reported recently in releasing statistics on this type of equipment for the first half of 1944. The trend toward increased demands for repairs and accessories is also evidenced by WPB figures.

Portable pneumatic tools include all portable working tools powered by compressed air (excluding drills and demolition tools) that are lifted,

held and operated by not more than two persons, WPB officials said. Portable electric tools include all metal working tools powered by a self-contained electric motor that are lifted, held and operated by not more than two persons.

Based on reports from 33 companies, the data in the table below represents nearly 90 per cent of the industry's total shipments, as against the 1943 data, which represented nearly 95 per cent of the industry's shipments and were based on reports from approximately 65 companies.

Portable Pneumatic and Electric Tool Shipments

Source—W.P.B. 1943-1944

Item	Total 1943	1944					
		Jan.	Feb.	March	April	May	June
Shipments	107,395	8,833	9,505	10,185	9,383	9,374	8,828
Adjusted New Orders—							
Less Cancellations ..	112,255	9,540	8,038	10,029	10,046	8,021	9,499
Unfilled Orders—							
End of Period	43,265	43,972	42,505	42,349	43,012	41,659	42,330

CAREY ROOFS for ALUMINUM COMPANY OF AMERICA



★ Extrusion Plant built for Aluminum Company of America, Acting for the Defense Plant Corporation by Day & Zimmerman, General Contractors, Philadelphia, Pa.

Carey 20-Year Bonded Built-Up Roofs applied by Warren Ehret Co., Roofing Contractors

To insure long-lasting, reliable protection for this new extrusion plant, Aluminum Company of America selected

Carey BUILT-UP ROOFS

These dependable roofs were chosen on a basis of known high quality, reliable protection and long-life—the same basis upon which

they have been selected for many of the nation's other important plants.

You're always SURE with a Carey Roof—sure of longer wear, dependable protection, lower yearly cost. And you're sure of having the work done "on schedule", with the aid of the nationwide CAREY Service Organization.

For full details, write Dept. 26.

THE PHILIP CAREY MFG. CO.—Lockland, Cincinnati, Ohio

Dependable Products Since 1873

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Office and Factory: Lennoxville, P. Q.

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PRODUCTS
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Heat Insulation . . . Asbestos-Cement Corrugated Roofing and Siding . . . Roll Roofings . . .
Asbestos-Cement Shingles, Siding, Wallboard and Sheathing . . . Built-Up Roofing . . .
Roof Coatings and Cements . . . Asphalt Shingles . . . Waterproofing . . . Elastite Expansion Joint

Packard Field Men Gather to Prepare Their Postwar Plans

Detroit

• • • Postwar plans, calling for an all-time high car output and utilization to the fullest extent of employment of returning veterans in an expanded sales and service organization, were outlined today at a conference of Packard Motor Car Co., regional managers, subsidiary heads and key distributors.

Sales manager L. W. Slack, who directed the three-day program, said the field men, in session at the Book-Cadillac hotel, represented the largest meeting of the group since Pearl Harbor. Nearly 100 attended.

Slack emphasized that doors to the growing sales and service operations will be opened particularly to men returning from military duty, not only because of the company's concentrated effort to employ veterans but also, "because the expanded job Packard has set itself to do calls for young men with ambition, drive and energy."

Packard president and general manager Geo. T. Christopher, first automotive industry head to set forth complete and concrete objectives of his company's motor car future, described the postwar sales goal Packard has established. He detailed production plans that reveal an all-time high of 200,000 cars per year "within 18 months after Packard gets the go-ahead."

Projected expansion of service facilities, Slack said, will center on surveys of Packard dealer shop equipment now being made from coast to coast. Dealer interest in facilities' improvement is running high, the sales

director stated, and it is planned to make modern installations and replace worn out equipment "as soon as the government says okay."

"Despite Packard's wartime obligations for aircraft and marine engines, which will be fulfilled as long as the nation needs them," Slack said, "plans have been sufficiently advanced to convince us that Packard will be in car production as soon as anyone else, given an even start."

WPB Proposes Reconversion Plans Upon Fall of Germany

Washington

• • • The WPB division of industry operations, headed by L. R. Boulware has proposed two reconversion plans to be put into effect upon the fall of Germany, thus providing that WPB still is driven by conflicting ideas.

One plan, which is said to be favored by Acting Chairman Krug would continue CMP for three months after the fall of Germany and permit industry to reconvert under the spot authorization procedure provided by Priorities Regulation No. 25. The Army and Navy would be given a simple priorities system to guarantee fulfillment of their needs. Thereafter all controls would be dropped except the ones over components critically needed by civilian industry.

The second plan would abolish all existing limitations including CMP immediately, with the exception of controls over the automobile and construction industries. These industries would be put under observation for a short period to determine what controls should be restored to insure smooth reconversion.

INDEX OF FOUNDRY EQUIPMENT ORDERS


June — 1943-1944

Net Orders Closed

	New Equipment	Repairs	Total Sales
1943 June	355.6	609.2	413.6
July	320.9	577.0	379.4
August	341.0	556.9	390.4
September	268.7	621.0	346.6
October	375.7	650.9	436.6
November	328.0	600.3	388.0
December	396.5	605.4	442.3
1944 January	321.6	577.5	378.3
February	402.6	648.2	456.8
March	457.6	642.6	498.4
April	322.2	610.1	385.7
May	477.0	598.8	503.9
June	426.8	604.8	466.1
July	327.5	546.4	375.8

31 Companies Reporting

NOTE: The foregoing figures are % of the 100% base (monthly average) of reported sales to metal working industries during 1937-38-39. A practical comparison of figures on the old base (1922-23-24 figures) can be determined by multiplying new base figures by 1.328.



Greater Tonnage
Per Edge of Blade

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SHEAR KNIFE CO.
HOMESTEAD · PENNSYLVANIA

Brad Foote Gears



IF IT'S A GEAR BRAD-FOOTE CAN MAKE IT

Brad-Foote Worm and Worm Gears were old hands at the business of record making installations for many years before the war.

Case records on these installations show many remarkable savings in production time due to the continuous performance of these units.

Came the War—These precision units were ready—They delivered what was demanded of them—in ample measure—in great numbers.—

*Worms and Worm Gears in Steel and Bronze.
Worm Gear Speed Reducers in standard or motorized units.*

BRAD FOOTE GEAR WORKS

1301 S. CICERO AVE. • CICERO, ILL.

Blast Furnace Capacity and Production—Net Tons Source: American Iron and Steel Institute

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
			July	Year to Date	July	Year to Date	July	Year to Date	Per Cent of Capacity	
									July	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern.....	10	12,815,680	929,917	6,562,123	23,679	146,248	953,596	6,708,371	88.0	89.9
Pittsburgh-Youngstown.....	15	26,852,460	2,085,509	14,832,087	20,317	143,151	2,105,826	14,975,238	92.8	95.8
Cleveland-Detroit.....	7	6,620,500	511,977	3,666,961			511,977	3,666,961	91.5	95.2
Chicago.....	6	13,575,540	1,099,272	7,769,936		8,780	1,099,272	7,778,716	95.8	98.4
Southern.....	8	4,822,780	332,529	2,442,757	18,669	100,977	351,198	2,543,734	86.1	93.9
Western.....	4	2,372,900	134,945	965,414			134,945	965,414	67.3	69.9
TOTAL.....	35	67,059,870	5,094,149	36,239,278	62,665	399,156	5,156,814	36,638,434	91.0	94.1

PIG IRON SUPPLIES PLENTIFUL? Little has been heard recently about a pig iron shortage. Most districts seem to have enough to meet demands and there has been evidence that some areas have more than they need. Latest figures according to the American Iron and Steel Institute indicate that total blast furnace capacity is not being used to the extent that was prevalent in January of this year. At that time operations were at 93.4 per cent of capacity while in July the output was at 91 per cent of capacity. Indications are that some districts are well supplied with pig iron to the extent that blast furnaces have been shut down for much needed repairs while other parts of the country seem to have adequate outlets for their iron.

Pullman Standard Offers Postwar Railroad Dining Car

Chicago

• • • A postwar railroad dining car to be offered by Pullman Standard Mfg. Co. will have diagonal seating, vibrationless tables, spot-ray illumination, and small tables for tête-à-tête dining for two.

The floor plan is designed to eliminate interruptions caused by arrivals and departures at the tables and to enable waiters to step to the side when serving, thus keeping the aisle free. Tables are placed diagonally and seats are set at a 45 deg. angle to the side of the car instead of at right angles to it as in ordinary diners. Tables seating four persons are square, but have the same area as the rectangular tables in other diners. Two place tables are triangular. Water bottles, creamers, sugar containers and menus will be kept on triangular shelves along the wall at the juncture of the diagonal seats.

USES Placements Rise

Chicago

• • • Placements by the United States Employment Service in Illinois climbed during the second quarter, figures just released show. The USES completed 46,410 placements in the state during June, an increase of 28 per cent over May and 23 per cent over last year. Most of the increase was downstate.

These figures correspond with statistics of the Illinois Department of Labor which indicate that employment declined 0.3 per cent between May and June in the Chicago metropolitan area but rose 1.7 per cent in the rest of the state.



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Fine accuracies can be secured only through the use of machines built to maintain exacting specifications.

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For over 57 years Sebastian has built lathes exclusively

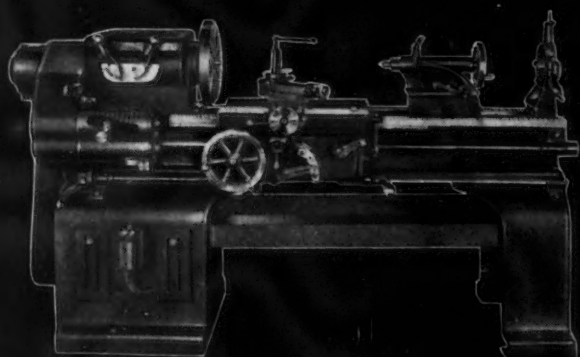
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MACHINE TOOLS

... News and Market Activities

Not Building Tools for Auto Production

Cleveland

• • • An undercurrent of whispers has been flying around town here like wildfire rumoring that machine tools were actually in production for some of the major automotive producers who were far sighted enough to jump in immediately with tooling orders as soon as the release came through from WPB. A check of some of the major producers and most likely "suspects" indicate that this is not only untrue but entirely unfounded.

Most machine tool producers who will talk about the subject and particularly those connected with highly automatic tool production state that a good many inquiries have been received and are being given close consideration. In many other cases tentative orders for machine tools for civilian production are actually on the books and some of these are admitted to have originated with automotive producers. Beyond this point nothing could be found in the way of production or close approach to production of any civilian purpose machine tools in this city.

The reason is that while permission to order civilian use machine tools has been granted, no provision has been made to give these orders a rating and an unrated order today in a machine tool shop is as good as no order at all. Machine tool builders are busy in most cases with war tools and parts subcontracts which leave no capacity or manpower to devote to less important work.

It is too early to say yet but it is believed that some tool builders who are not so busy with war tools may soon be able to begin civilian tool building. They, like all potential civilian product makers, must undergo the scrutiny of PR 25 qualifications to devote manpower, material and facilities to civilian production which these tools represent. Due to the advantage to be gained for the nation by permitting early production of these tools it is believed that machine tool builders may be one of the first group of firms to be given a more or less blanket go ahead. Meanwhile this has not been given and production is most likely confined entirely to war essential production.

When it does come, it is conceivable

that a tool builder with say a capacity for 12 in. machines which is not engaged by war contracts and whose men are not vitally needed on another of his production lines may be permitted to produce this 12 in. machine for civilian shops providing a lot of "ifs" are met satisfactorily. It takes considerable time to iron out the "ifs" which must be met at present and so auto industry tooling is still seen some distance away.

Meanwhile machine tool builders here have postwar plans far outside

Amended OPA Rule Affects Jigs and Fixtures

Washington

• • • Relating mainly to coverage of the regulations but including two minor changes in pricing provisions, OPA recently announced revisions in the regulation governing prices of machines and parts and machinery services. The amendment adds ground keywork, such as cocks and stops, to the coverage of the regulation, when sold by the manufacturer to producers and resellers of machines and parts, manufacturers and resellers of farm equipment and manufacturers of automotive parts. Sales of such parts by persons engaged in the business of selling machines are also covered by the regulation, as are sales of metal hatch covers at manufacturers' and wholesale levels. The change in coverage will not affect the present general level of their prices.

The coverage of jigs and fixtures is also affected by the amendment. As in the case of dies, molds and patterns, jigs and fixtures are now excluded from coverage by this regulation when sold in connection with the sale of another product and the maximum price for the product includes the price of the jig or fixture.

A change was made in the provision by which manufacturers determine the allowance to a purchaser for scrap or wastage generated during the manufacture of a product. Because of the decline in scrap prices, manufacturers may now use current market prices for such scrap in place of the prices in effect on the base dates of the regulation.

the machine tool field and it will be surprising when it is known how far many of these old line tool builders will have broadened their lines: So far no machine tool builder has disclosed any leaning toward engaging in the consumer durable goods field since sales organizations for such products are too tough to build and too costly for most. While many earlier guessers picked consumer durables as the ideal outlet for excess machine tool shop capacity in the postwar period, most builders expect to build and sell machines but not necessarily machine tools alone.

Machine Tool Shipments Declined 18.2% in July

Washington

• • • Shipments of machine tools in July were valued at \$33,916,000, a decrease of 18.2 per cent under shipments in June, which were valued at \$41,471,000, according to the WPB Tools Division. The value of July net firm orders—total firm orders received less cancellations—decreased to \$33,224,000 or 33 per cent below the June total of \$49,578,000. The backlog of unfilled orders at the end of July was \$194,588,000 or 0.1 per cent over the June backlog of \$194,450,000. Orders canceled in July were valued at \$4,056,000, a decrease of 6.8 per cent from the June cancellations of \$4,354,000.

The division said that shipment figures for July were compiled from data of 347 machine tool companies. At the July rate of shipments, it was pointed out, it would require approximately 5½ months to fill the backlog of orders on hand.

Machine Tool Builders Alert

Cincinnati

• • • Rapid advance of the American forces in France has brought more concentrated attention on postwar programs of district machine tool builders. Research departments are working hard to bring about new items and improvements on old to meet postwar competition, but while manufacturers talk of planning no details beyond the fact of the work have been revealed. Current bookings are in fair volume and continue to be at sufficient level.

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Endless Rows of Tank Shoes from saws that never stop

These six MARVEL No. 6A automatic Production Hack Saws, in the Louisville plant of the Service Welding and Machine Co., never stop except for necessary service—changing of blades, etc. Day after day on a 24 hour schedule they automatically cut 20 ft. sections of SAE 1020 Steel into multiple 6½" lengths. This is "continuous high speed metal sawing at low cost", in fact.

Each of these pieces welded to a "Z" shaped forging makes a "shoe" for an Army Tank.

Before the Service Welding & Machine Co. took this contract they investigated various types and methods of "high speed production sawing" and selected MARVEL Production Saws as the most able and certain to deliver and maintain rapid, accurate production at low cost.

Write for Catalog showing the complete MARVEL System of Metal Sawing.

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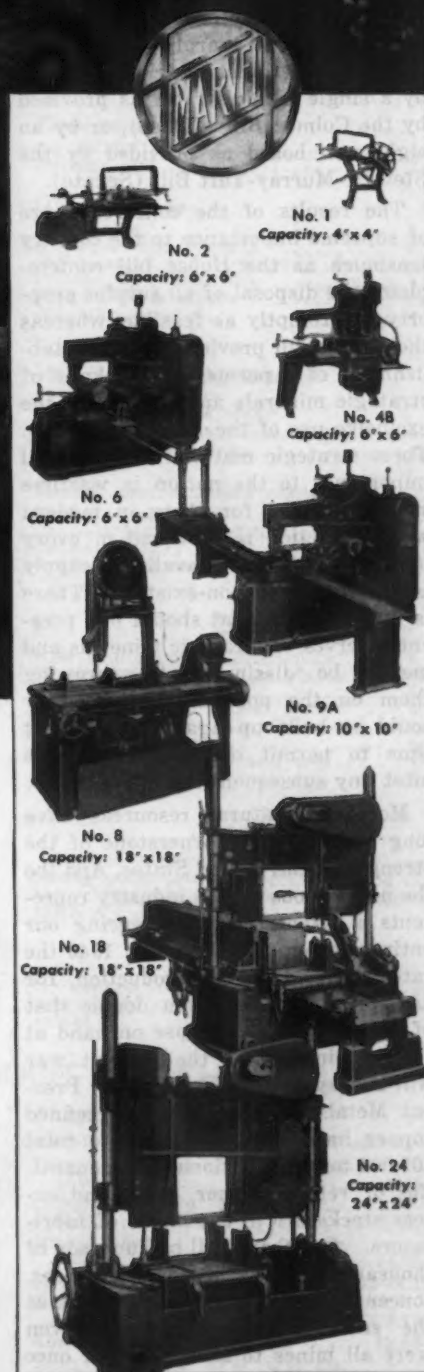
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MARVEL SAWS



NON-FERROUS METALS

... News and Market Activities

U.S. Strategic Metal Resources Depend on Handling of Surpluses

Washington

• • • The Senate and House bills prescribing the procedures by which war surplus materials accumulated by the government should be disposed of are now under consideration by a joint congressional conference committee. Conferees are sharply divided on whether control should be exercised by a single administrator as provided by the Colmer Bill (House), or by an eight-man board as provided by the Stewart-Murray-Taft Bill (Senate).

The results of the conference are of supreme importance to the country inasmuch as the House bill contemplates the disposal of all surplus property as promptly as feasible, whereas the Senate bill provides for the establishment of a permanent stockpile of strategic minerals and metals for the exclusive use of the Army and Navy. These strategic materials are of vital importance to the nation in wartime since the need for them in modern war production is vast and in every instance our quickly available supply is inadequate or non-existent. There is no assurance that should our present reserves of strategic minerals and metals be dissipated by throwing them on the postwar market, they could be built up again in sufficient time to permit our rearmament to meet any subsequent aggressor.

Moreover, natural resources have long constituted a cornerstone of the strength of the United States. And the non-ferrous metals industry represents a potent factor influencing our entire economic position. In 1943 the rate of world copper production, for example, was more than double that of 1918. Stocks of copper on hand at the termination of the present war will be larger than ever before. Present Metals Reserve stocks of refined copper have been estimated to total 303,000 tons. Additional huge quantities of refined copper, scrap and excess stocks are in the hands of fabricators. And there will be hundreds of thousands of tons of copper in ores, concentrates and process materials at the smelters and refineries. Even were all mines to close down at once

after the war, total stocks of copper on hand would amount to at least two to three years' supply at prewar consumption rates.

The condition of the copper industry after the termination of the last war should serve to guide our handling of surpluses from this war. At the conclusion of World War I, stocks of copper on hand were greater than had ever been consumed in any previous single year. Production was in full swing and it was impossible to shut off the flow through mines, concentrators, smelters and refineries. The industry made strenuous efforts to control production but despite all efforts there was a steady increase in stocks of copper and a ruinously chaotic condition which forced practically the entire industry to close down in 1921. While operations were resumed to some extent in 1922, it was not because economic conditions justified it but merely to restore some

means of livelihood to the communities dependent on copper mining and refining.

Should surpluses of the strategic minerals and metals not be stockpiled now for the permanent availability of our military services, many mine properties would be compelled to close down. The owners must decide whether to maintain pumping and drainage operations and to keep timber and mine workings in shape to renew operations, or to pull the pumps and let the mines flood. If there is a fair hope of a change in economic conditions in any reasonable time, temporary losses are preferred by mining enterprises to closing. However, there is a real danger that a large percentage of the country's limited strategic ore reserves may be lost forever, or recovered only at prohibitive cost. For drainage of these mines, their general rehabilitation and repair of shafts, timbers and underground workings would in many cases exceed the gross value of all remaining ore reserves without allowance for ordinary production costs.

• • •

Aluminum Reserves Cause Cutbacks

Washington

• • • The piling up of aluminum ingots for both military and civilian use as the result of the tremendous expansion in capacity to more than 2,250,000,000 lb. annually is reflected in WPB's announcement recently of further cutbacks in production affecting the government-owned facilities in Spokane, Wash.; Los Angeles; Troutdale, Ore., and Jones Mills, Ark. In addition, WPB said, the Aluminum Co. of America will reduce production in its own plants at Alcoa, Tenn.;

Badin, N. C.; Massena, N. Y., and Vancouver, Wash. This, it was stated, is in accord with Alcoa's contract with DPC, which provides that when production in government-owned plants should reach the present level, further curtailment would be divided between DPC and Alcoa plants.

The announcement said that less than 1000 workers will be affected by these reduced schedules and that more than 500 of these are in Los Angeles where there is an acute labor shortage. The plant there is the only one which will be completely shut down. Total reduction in production as a result of the combined cutbacks will amount to approximately 30,000,000 lb. of ingots monthly, WPB reported. Monthly production then will amount to slightly more than 90,000,000 lb. as compared with the all-time record of approximately 188,000,000 lb. reached early last winter. WPB officials said that scheduled imports of aluminum from Canada also had been reduced sharply.

Cuts in DPC Aluminum Plants in Millions of Lb.

	Capacity	July Production	Amounts to be Curtailed
Jones Mills..	12	11.9	3
Los Angeles..	15	9.5	6
Spokane.....	18	17.9	6
Troutdale...	12	8.7	3

NON-FERROUS METALS PRICES

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd.	90.00
Cobalt, 97-99% (dollars per lb.)	\$2.11
100 lb. or more	\$1.50
Copper, electro. Conn. valley	12.00
Copper, electro. New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.5%, dollars per troy oz.	\$7.50
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$103 to \$105.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	12.00
Aluminum, deoxidizing	7.50 to 11.00
Brass Ingot	
88-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
88-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.37	20.37	20.37
Copper, H.R.	17.37	17.37	17.37
Copper drawn	18.37	18.37	18.37
Low brass, 80%	20.40	20.15	20.15
High brass	19.48	19.48	19.48
Red brass, 85%	20.61	20.36	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	15.01		
Commercial bronze, 90%	21.32	21.07	21.07
Commercial bronze, 95%	21.53	21.28	21.28
Manganese bronze	24.00	23.00	23.00
Phos. bronze, A, B, 5%	36.50	36.25	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculey, Olympic or equal	25.50	26.00	26.00
Nickel silver, 5%	28.75	26.50	26.50
Architect bronze	19.12		

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/4 H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (Phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3†

Yellow brass soft sheet clippings	3.625
Yellow rod brass turnings	3.375
Zincy bronze borings	3.00
Zincy bronze solids	3.00
Fired rifle shells	3.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25*
Manganese bronze solids	6.25*
Manganese bronze borings	6.50*
Manganese bronze borings	5.50*

OPA Group 4†

Automobile radiators	7.00
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OPA Group 5†

Refinery brass	4.75*
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*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. *Lead content 0.41 to 1.00 per cent.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

Other Copper Alloy†

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

All S-type alloys (except 2S)	6.00
2s solids	7.50
High grade alloys (cast)	6.00
Low grade alloys	4.00
Borings and turnings	
High grade alloys	4.00
Low grade alloys	2.50

Plant scrap, mixed

All solids	4.00
Borings and turnings	2.25

Obsolete scrap

Pure cable	7.00*
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	4.50
Pistons, with struts	2.50
Old alloy sheet	4.00

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	3.00

Mixed, contaminated plant scrap

Grade 1 solids	6.00
Grade 1 borings and turnings	3.00
Grade 2 solids	3.00
Grade 2 borings and turnings	3.00

Zinc

New zinc clippings, trimmings	6.50
Engravers' lithographers plates	6.50
Old zinc scrap	5.25
Unswaged zinc dross	5.50
Die cast slab	5.00
New die cast scrap	4.95
Radiator grilles, old and new	4.00
Old die cast scrap	3.50

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under 1/4%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 1/2
Electrolytic, full size	22 1/2
cut to size	30 1/2
Roller, oval, straight, 15 in. and longer	23 1/2
Curved	24 1/2
Brass Cast, 32-20, elliptical, 15 in. and longer	23 1/2
Zinc: Cast, 99.99, 16 in. and over	16 1/2
Nickel: 99% plus, cast	47
Roller, depolarized	48
Silver: Roller, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots. 40.82-41.125	
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	32.00
Zinc sulphate, 89% crystals, bbls.	6.80

SCRAP

... News and Market Activities

Market Stagnation Due to War

• • • New contracts for the purchase of scrap iron and steel are virtually non-existent this week. Practically all steel mills are out of the scrap market. Reports from Pittsburgh indicate that mills there are not buying because their production of home scrap and inventories of previously purchased scrap are sufficiently high to cover all reasonable demands for some time to come. In fact, scrap supplies of mills in that area are said to be sufficient to permit upgrading of scrap. In other words instead of accepting shipments of scrap not conforming in full with grade specifications at a lower price than the grade contracted for, the car is rejected and returned to the shipper.

Mills in other areas are not generally in such a fortunate position with respect to scrap supplies. In fact, there are indications that should Germany fail to collapse within a few weeks' time, some mills may have difficulty in covering scrap requirements to meet production quotas without at the very least pushing scrap prices back to ceilings. In such

an event it will be fortunate if the scrap industry is in a position to provide the required supplies, considering the labor shortage and the fact that yards have long been squeezed between fixed ceilings and rising costs. Dealers have not been able to continue accumulating stocks for such an emergency because, despite the imposition of ceilings, floor prices on scrap have not been established. Were they to continue to purchase regardless of the prospects for immediate sale, drastic losses would be suffered when demand falls off. Moreover manpower shortage would prevent proper preparation of scrap in the yards. This situation is reflected in the recent request on mills to survey their scrap inventories by the Director of WPB's Steel Div.

Since there has been little or no action in the market this week, listed prices represent latest recorded sales. It is apparent that cast grades which last week were selling everywhere at ceilings were showing definite evidence of softening in price at a few locations.

PITTSBURGH—Scrap sales here still continue non-existent. Even WPB allocations of various types of scrap including rail specialties are being refused by the consumers on the grounds that they have enough scrap in stock now to take care of their needs. No letup is in sight for the dullness of the market, especially so since the coal strike seems to be petering out.

CHICAGO—Until purchasing is resumed by principal consumers in this market, prices quoted must be considered nominal. Although Chicago sentiment is somewhat firmer than other districts, it is generally accepted that discounts from former prices will prevail. Activity preceding Labor Day was at a standstill.

BOSTON—Business is confined largely to occasional cars of contract material, foundry scrap which holds at ceilings, and contract No. 1 chemical borings also at ceilings. Quotations on new business are nominal. However, an eastern Pennsylvania consumer, for two weeks only, offers \$13.73 for heavy melting steel on cars any shipping point, Boston area included. Few have accepted the bid. Pittsburgh area consumers are still out of the market.

NEW YORK—Market activity in this area is virtually non-existent this week.

Every Pittsburgh mill is out of the market, and the only mill in the local market area offering to buy is bidding at staggeringly low prices. Brokers are buying today only for delivery prior to date of cancellation on their existent contracts. In the present state of the market listed New York prices represent the latest recorded sales.

PHILADELPHIA—The market here has come to a virtual standstill. Few new orders have been placed and those have reduced the shipping time to two weeks. Opinions as to another drop in the price of heavy melting steel scrap vary but those who believe that scrap prices will be further depressed point to the extreme caution exercised by the mills in making scrap purchases. Cast grades are still strong and continue to be sold at ceiling prices.

BUFFALO—A substantial increase in tenders on current contracts is noted here as a direct result of the lowering of bids on No. 1 heavy melting to \$13.25, a dollar under the ceiling, by the leading consumer. With the exception of machine shop turnings, however, no business has been placed below ceilings. Acid test of the market is expected when most dealers' contracts expire in mid-September. Meanwhile, dealer resistance to the

move to hammer down prices appears to be gaining ground, although a few are rumored to be protecting themselves by lowering buying prices \$2 to \$3 a ton on slower moving items. Low phosphorus grades are reported slowing down and cast iron scrap, firmest of the list, appears to be in slightly better supply.

CLEVELAND—There are still no indications of buying although there is some expectancy of limited purchases after Labor Day. Offering prices do not seem to have much effect as most offers are being refused regardless of price. Some blast furnace scrap is going out of town on a basis of \$14 to \$14.50 f.o.b. cars, but slightly higher may be gotten locally when buying returns, according to pure opinion. Consumers continue to report comfortable stocks and blame lack of buying on this fact which is privately coupled with the optimistic war outlook. No new contracts are being written at present and consumers have been quick to cancel outstanding contracts promptly on the expiration dates. Even cast grades show a softening in lowered limitations as to the amount of freight which will be paid on shipments.

ST. LOUIS—Dealers of scrap iron in the St. Louis industrial district are said to be anxious to liquidate their inventories because of the possibility of a sudden collapse of Germany, but they are having difficulty doing so as there is a scarcity of labor. They are trying to sell what they have for 60 day delivery, but the mills want to buy on 30 day delivery.

BIRMINGHAM—The bottom has dropped out of the scrap market in this area with the biggest consumer making no commitments whatever. Practically no offers are being made for either open hearth or blast furnace grades. Other grades sold are going from \$2 to \$4.50 under ceilings.

CINCINNATI—The market except for continued purchases among foundry users is quiet. Most mills in the area are out of the market and watching inventories closely in the light of the war developments. Foundries however show no reluctance to take scrap as offered. Pressure on specifications however continues as users insist on more exact specifications.

DETROIT—Scrap prices continued on the toboggan here this week in shipments out of town. Heavy melting slipped off around \$1.50 per ton and breakable cast shaky for some time sold below ceiling. A home for alloy grades is hard to find and talk is heard of a few scattered sales being made as much as \$5 or so below ceiling prices.

... Iron and Steel Scrap Prices

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4).

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$19.50 to \$20.00
RR hvy. mltng. steel	21.00
No. 2 hvy. melting...	19.50 to 20.00
Railroad scrap rails...	21.50
Rolls, 3 ft. and under	23.50
Compressed sheet stl.	19.50 to 20.00
Hand bundled new sheets	19.50 to 20.00
Hvy. axle turnings...	19.50
Hvy. forge turnings...	19.50
Machine shop turn'gs	14.50 to 15.00
Shovel. turnings, alloy free	16.50 to 17.00
Mixed bor. & turn...	14.50 to 15.00
Cast iron borings...	15.50 to 16.00
Hvy. breakable cast...	18.00 to 18.50
No. 1 cupola cast...	24.00 to 25.00
RR knuckles and couplings	24.00 to 24.50
RR coil springs...	24.00 to 24.50
RR leaf springs...	24.00 to 24.50
RR rolled steel whls.	24.00 to 24.50
Low phos. billet crops	25.00
Low phos. punchings	22.50
Railroad malleable...	22.00

CHICAGO

Per gross ton delivered to consumer

No. 1 hvy. melting...	\$18.75
No. 2 hvy. melting...	18.75
No. 1 bundles...	18.75
Bndld. mach. shop. turnings	18.75
Galv. bundles (No. 3)	16.75
Mach. shop turnings...	11.00
Short shoveling trngs.	13.75
Cast iron borings...	12.75
Mix bor. & short turn.	12.75
Low phos. hvy. forge	23.75
Low phos. plates...	21.25
"On-Line" Prices Railroad Scrap:	
No. 1 RR hvy. mltng.	19.75
No. 2 RR hvy. mltng.	19.75
Flues, tubes & pipes	16.25
Reroll rails	22.25
Cut rails, 3 ft. and under	22.25
Locomotive tires, cut.	24.25
Cut bolsters & side frames	22.25
Angle & splice bars...	22.25
No. 3 steel wheels...	23.25
Couplers & knuckles...	23.25
Cut rails, 2 ft. and under	23.50
Miscellaneous rails...	20.25
Std'd stl. car axles	25.75
Per gross ton f.o.b. Shipping Point	
No. 1 mach. cast...	20.00
No. 1 agricul. cast...	20.00
Cast iron car wheels	20.00
Hvy. breakable cast...	16.50
RR grate bars	15.25
Brake shoes	15.25
Stove plate	19.00
Clean auto cast...	20.00
Agricul. malleable...	22.00
RR malleable	22.00

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting...	\$14.50 to \$15.00
No. 1 hyd. comp. sh'ts	14.50 to 15.00
No. 2 hvy. melting...	14.50 to 15.00
No. 1 bundles	14.50 to 15.00
New busheling	14.50 to 15.00
Mach. shop turnings...	9.50 to 10.00
Short shov. turnings	11.50 to 12.00
Cast iron borings...	10.50 to 11.00
Mixed bor. & turns...	9.50 to 10.00
No. 1 cupola cast...	20.00
Charging box cast...	19.00
Hvy. breakable cast...	14.00 to 14.50
Stove plate	19.00
Flashings	15.00 to 15.50
Low phos. plate...	16.50 to 17.00
Automotive cast	20.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$18.00 to \$19.00
No. 2 hvy. melting...	18.00 to 19.00
Compressed sheet stl.	18.00 to 19.00
Drop forge flashings	18.00 to 19.00
Mach. shop turnings...	13.00 to 14.00
Short shovel. trngs.	15.00 to 16.00
No. 1 busheling...	18.00 to 19.00
Steel axle turnings...	17.50 to 18.50
Low phos. billet and bloom crops	23.50 to 24.00
Cast iron borings	14.00 to 15.00
Mixed bor. & turns...	13.00 to 14.00
No. 2 busheling...	15.50 to 16.50
No. 1 machine cast...	20.00
Railroad cast	20.00
Railroad grate bars...	15.25
Stove plate	19.00
Rolls 3 ft. & under...	23.00
Rolls 18 in. & under	24.25
Rolls for rerolling...	23.00
Railroad malleable...	22.00
Elec. furnace punchings	19.50 to 20.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$17.75 to \$18.25
No. 2 hvy. melting...	17.75 to 18.25
No. 1 Bundles	17.75 to 18.25
Mach. shop turnings...	12.50 to 13.00
Shoveling turnings...	14.50 to 15.00
Cast iron borings...	13.50 to 14.00
Mixed bor. & turns...	12.50 to 13.00
No. 1 cupola cast...	20.00
Hvy. breakable cast...	16.50
Hvy. axle turnings...	17.25 to 17.75
Hvy. forge turnings...	17.25 to 17.75
Low phos. plate...	19.75 to 20.25
Low phos. punch...	20.50 to 21.00
Billet crops	22.00

ST. LOUIS

Per gross ton delivered to consumer:

Hvy. melting	\$17.50
No. 1 locomotive tires	21.00
Misc. stand. sec. rails	19.00
Railroad springs	22.00
Bundled sheets	17.50
Heavy turnings	16.75
Rerolling rails	21.00
Steel car axles...	23.50
Steel rails under 3 ft.	21.50
Steel angle bars	21.00
Cast iron car wheels	20.00
No. 1 machinery cast	20.00
Railroad malleable	22.00
Breakable cast	16.50
Stove plate	19.00
Grate bars	15.25
Brake shoes	15.25

Note: Cast grades f.o.b. Shipping Point.

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$17.00
No. 2 hvy. melting...	17.00
No. 2 bundles	16.00
No. 1 busheling	15.00
Scrap rails	15.00
Rolls 3 ft. & under...	18.50
Angle & splice bars...	17.50
Cast iron borings...	12.00
Steel axles	17.00
Stove plate	17.50
Bar Crops and plate	17.00
Structural and plate	17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$18.50 to \$19.50
No. 2 hvy. melting...	18.50 to 19.50
Low phos plate...	20.00 to 21.00
No. 1 busheling...	18.50 to 19.50
Hydraulic bundles...	18.50 to 20.50
Mach. shop turnings...	14.50 to 15.00
Short shovel. trngs...	16.00 to 16.50
Cast iron borings...	15.00 to 15.50

NEW YORK

Dealers' buying prices, per gross ton, on cars:

No. 1 hvy. melting...	\$14.00 to \$14.50
No. 2 hvy. melting...	14.00 to 14.50
Hvy. breakable cast...	16.50
Charging box cast...	19.00
No. 1 cupola cast...	20.00
Stove plate	19.00
No. 1 busheling...	14.00 to 14.50
Hyd. comp. black bundles	14.00 to 14.50
Hyd. comp. galv. bundles	12.00 to 12.50
Clean chem. cast bor.	14.33
Mach. shop turnings...	9.25 to 9.75
Mixed bor. & turns...	9.25 to 9.75
Clean auto cast...	20.00
Unstrip. motor blks...	17.50
No. 1 cupola cast...	20.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$19.50
No. 2 hvy. melting...	19.50
No. 1 Bundles	19.50
No. 2 Bundles	19.50
Mach. shop turnings...	14.50
Shoveling turnings...	16.50
Cast iron borings...	15.50
Mixed bor. & Turns...	14.50
No. 1 cupola cast...	21.00
Hvy. breakable cast...	16.50
Low phos. plate...	22.57
Scrap rails	21.00
Stove plate	19.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$19.25
No. 1 bundles	19.25
No. 2 bundles	19.25
No. 2 hvy. melting...	19.25
Mach. shop turnings	13.00 to 14.25
Shoveling turnings...	16.25
Cast iron borings...	15.25
Mixed bor. & turns...	14.25
No. 1 cupola cast...	20.00
Stove plate	19.00
Low phos. plate	21.75
Scrap rails	20.75
Rolls 3 ft. & under...	22.75
RR steel wheels...	23.75
Cast iron car wheels	20.00
RR coil & leaf sprgs.	23.75
RR knuckles & coup.	23.75
RR malleable	22.00
No. 1 busheling	19.25

Note: Cast grades f.o.b. Shipping Point.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting...	\$13.75 to \$14.00
Breakable cast	16.50
Turnings, shoveling...	12.95
Mixed alloy turnings	8.00 to 9.06
Mixed bor. & turns...	5.00
Bundled skeleton	13.75 to 14.00
Stove plate	19.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$14.00 to \$15.53
RR hvy. melting	15.53
No. 2 hvy. melting...	13.00 to 14.53
Mach. shop turnings...	3.50 to 6.00
No. 1 cupola cast...	23.00 to 24.00

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 176-185.

Pig Iron: (Per Gross Ton)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.89
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese†	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
†For carlots at seaboard.

Scrap: (Per Gross Ton)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Heavy meltg steel, P'gh.	\$19.76	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.00	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy.comp. sheet, Det.	15.25	17.85	17.85	17.85
Low phos. plate, Youngs'n	20.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Furnace coke, prompt	\$7.00	\$7.00	\$7.00	\$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.50

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Sept. 5, 1944	Aug. 29, 1944	Aug. 1, 1944	Sept. 7, 1943
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

FINISHED STEEL				PIG IRON				SCRAP STEEL							
September 5, 1944.....	2.25513c.	a Lb.....	.....	23.61	a Gross Ton.....	.....	\$18.84	a Gross Ton.....	.....					
One week ago	2.25513c.	a Lb.....	.....	23.61	a Gross Ton.....	.....	\$19.17	a Gross Ton.....	.....					
One month ago	2.25513c.	a Lb.....	.....	23.61	a Gross Ton.....	.....	\$19.17	a Gross Ton.....	.....					
One year ago	2.26190c.	a Lb.....	.....	23.61	a Gross Ton.....	.....	\$19.17	a Gross Ton.....	.....					
HIGH				LOW				HIGH				LOW			
1943.....	2.25513c.,			2.25513c.,				\$23.61				\$19.17			
1942.....	2.26190c.,			2.26190c.,				23.61				19.17			
1941.....	2.43078c.,			2.43078c.,				\$23.61,	Mar. 20	\$23.45,	Jan. 2	\$22.00,	Jan. 7	\$19.17,	Apr. 10
1940.....	2.30467c.,	Jan. 2	2.24107c.,	Apr. 16	23.45,	Dec. 23	22.61,	Jan. 2	21.83,	Dec. 30	16.04,	Apr. 9			
1939.....	2.35367c.,	Jan. 3	2.26689c.,	May 16	22.61,	Sept. 19	20.61,	Sept. 12	22.50,	Oct. 3	14.08,	May 16			
1938.....	2.58414c.,	Jan. 4	2.27207c.,	Oct. 18	23.25,	June 21	19.61,	July 6	15.00,	Nov. 22	11.00,	June 7			
1937.....	2.58414c.,	Mar. 9	2.32263c.,	Jan. 4	23.25,	Mar. 9	20.25,	Feb. 16	21.92,	Mar. 30	12.67,	June 8			
1936.....	2.32263c.,	Dec. 28	2.05200c.,	Mar. 10	19.74,	Nov. 24	18.73,	Aug. 11	17.75,	Dec. 21	12.67,	June 9			
1935.....	2.07642c.,	Oct. 1	2.06492c.,	Jan. 8	18.84,	Nov. 5	17.83,	May 14	13.42,	Dec. 10	10.33,	Apr. 29			
1934.....	2.15367c.,	Apr. 24	1.95757c.,	Jan. 2	17.90,	May 1	16.90,	Jan. 27	13.00,	Mar. 13	9.50,	Sept. 25			
1933.....	1.95578c.,	Oct. 3	1.75836c.,	May 2	16.90,	Dec. 5	13.56,	Jan. 3	12.25,	Aug. 8	6.75,	Jan. 3			
1932.....	1.89196c.,	July 5	1.83901c.,	Mar. 1	14.81,	Jan. 5	13.56,	Dec. 6	8.50,	Jan. 12	6.43,	July 5			
1931.....	1.99626c.,	Jan. 13	1.86586c.,	Dec. 29	15.90,	Jan. 6	14.79,	Dec. 15	11.33,	Jan. 6	8.50,	Dec. 29			
1930.....	2.25488c.,	Jan. 7	1.97319c.,	Dec. 9	18.21,	Jan. 7	15.90,	Dec. 16	15.00,	Feb. 18	11.25,	Dec. 9			
1929.....	2.31773c.,	May 28	2.26498c.,	Oct. 29	18.71,	May 14	18.21,	Dec. 17	17.58,	Jan. 29	14.08,	Dec. 17			

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 23, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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BALDWIN

STANDARD

STEEL FORGINGS & CASTINGS

Finished Iron and Steel Prices

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point Product														DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Provo, Utah	10 Pacific Ports, Cars	Detroit	New York	Phila- delphia
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢	2.20¢	2.34¢	2.27¢
Cold Rolled Sheets ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢			3.70¢	3.15¢	3.39¢	3.37¢
Galv. Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢		3.74¢	3.67¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢			4.00¢	3.45¢	3.71¢	3.67¢
Long Terns ²	3.80¢	3.80¢	3.80¢										4.55¢		4.16¢	4.12¢
Hot Rolled Strip ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢	2.20¢	2.46¢	
Cold Rolled Strip ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)						2.90¢	3.16¢	
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢								2.56¢	
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)						3.05¢	3.31¢	
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10						5.36¢	5.32¢
.50 } Electro Tin Plate, Box .75 }	\$4.50	\$4.50	\$4.50						\$4.60							
	\$4.65		\$4.65						\$4.75							
Black Plate (29 gage) ⁵	3.05¢	3.05¢	3.05¢						3.15¢				4.05¢ ¹³			3.37¢
Mfg. Terns, Special Box	\$4.30	\$4.30	\$4.30						\$4.40							
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth=2.25¢)			2.50¢		2.80¢	2.25¢	2.49¢	2.47¢
Rail Steel Bars ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢		2.80¢			
Reinforcing (Billet) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢		2.55¢ ¹³	2.25¢	2.39¢	
Reinforcing (Rail) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢		2.55¢ ¹³	2.25¢		2.47¢
Cold Finished Bars ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit=2.70¢)			(Toledo=2.80¢)			2.99¢	2.97¢	
Alloy Bars, Hot Rolled	2.70¢	2.70¢					2.70¢	(Bethlehem, Massillon, Canton=2.70¢)						2.80¢		
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢								3.45¢		
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.60¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢									3.70¢		4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢									3.95¢		4.15¢		3.70¢	3.59¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem=2.10¢)			2.45¢		2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester=3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester=4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester=6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester=8.55¢)								
Bright Wire ¹⁴	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester=2.70¢)			(Duluth=2.65¢)		3.10¢			2.92¢
Galvanized Wire	Add proper size extra and galvanizing extra to Bright Wire base															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester=3.30¢)					3.70¢			3.52¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢							2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6
Slabs—Andrews Steel Co. \$41 basing pts.;
Wheeling Steel Corp. \$34 Portsmouth,
Ohio; Empire Sheet & Tin Plate Corp.
\$41; Phoenix Iron Co. (rerolling) \$41,
(forging) \$47; Granite City Steel \$47.50.
Blooms—Phoenix Iron Co. (rerolling) \$41,
(forging) \$47; Pgh. Steel Co. (reroll)
\$38.25, (forging) \$44.25.

Sheet Bar—Empire Sheet & Tin Plate Co.
\$39 mill; Wheeling Steel Corp. \$38 Portsmouth,
Ohio.

Billets, Forging—Andrews Steel Co. \$50
basing pts.; Follansbee Steel Corp. \$49.50
Toronto; Phoenix Iron Co. \$47.00 mill.
Geneva Steel Co. \$64.64 f.o.b. Pacific Coast;
Pittsburgh Steel Co. \$49.50.

Billets, Rerolling—Continental Steel Corp.
may charge Acme Steel in Chicago switching
area \$34 plus freight from Kokomo,
Ind.; Northwestern Steel & Wire Co.
(Lend-Lease) \$41 mill; Wheeling Steel
Corp. (small) \$36 Portsmouth, Ohio;
(blooming mill sizes) applicable base,
f.o.b. Portsmouth, Ohio; Stanley Works
may sell Washburn Wire Co. under allocation
at \$39 Bridgeport, Conn.; Keystone
Steel & Wire Co. may sell Acme
Steel Co. at Chicago base, f.o.b. Peoria;
Phoenix Iron Co. \$41 mill; Continental
Steel Corp. (1½ x 1½) \$39.50, (2 x 2)
\$40.60 Kokomo, Ind. (these prices include
\$1 size extra); Keystone Steel & Wire
Co. \$36.40 Peoria; Connors Steel Co.
\$50.69 Birmingham; Ford Motor Co. \$34
Dearborn, Mich. Geneva Steel Co. \$58.64
f.o.b. Pac. C. Pgh. Steel Co. \$43.50.

Structural Shapes—Phoenix Iron Co. \$2.35
basing pts. (export) \$2.50 Phoenixville;

Knoxville Iron Co. \$2.30 basing points.

Bar Size Shapes—(Angles) W. Ames &
Co., 10 tons or over, \$3.10 mill.

Rails—Sweet Steel Co. (rail steel) \$50
mill; West Virginia Rail Co. (lightweight)
on allocation based Huntington, W. Va.;
Colorado Fuel & Iron Corp., \$45 Pueblo.
Hot Rolled Plate—Granite City Steel Co.
\$2.65 mill; Knoxville Iron Co. \$2.25 basing
pts.; Kaiser Co. and Geneva Steel Co.
\$3.20 Pacific Ports; Central Iron & Steel
Co. \$2.50 basing points; Granite City Steel
Co. \$2.35 Granite City.

Merchant Bars—W. Ames Co., 10 tons
and over, \$2.85 mill; Eckels-Nye Steel
Corp., \$2.50 basing pts. (rail steel) \$2.40;
Phoenix Iron Co. \$2.40 basing pts.; Sweet
Steel Co. (rail steel) \$2.35 mill; Joslyn
Mfg. & Supply Co., \$2.35 Chicago; Calumet
Steel Div., Borg Warner Corp. (8 in.
mill bars) \$2.35 Chicago; Knoxville Iron
Co. \$2.30 basing pts. Laclede Steel Co.,
sales to LaSalle Steel granted Chicago
base, f.o.b. Madison, Ill. Milton Mfg. Co.
\$2.75 f.o.b. Milton, Pa.

Logan Iron and Steel Co., Burnham, Pa.,
wrought iron bars, Grade I, \$7.90 per
100 lb. f.o.b. plant. Ceiling is \$7.40 per
100 lb.

Reinforcing Bars—W. Ames & Co., 10
tons and over, \$2.85 mill; Sweet Steel Co.
(rail steel) \$2.35 mill; Columbia Steel Co.
\$2.50 Pacific Ports.

Cold Finished Bars—Keystone, Drawn
Steel Co. on allocation, Pittsburgh c.f.
base plus c/l freight on hot rolled bars
Pittsburgh to Spring City, Pa.; New England
Drawn Steel Co. on allocation outside
New England, Buffalo c.f. base plus
c/l freight Buffalo to Massfield, Mass.,

f.o.b. Massfield; Empire Finished Steel
Corp. on allocation outside New England,
Buffalo c.f. base plus c/l freight Buffalo
to plants f.o.b. plant; Compressed Steel
Shafting Co. on allocation outside New
England, Buffalo base plus c/l freight
Buffalo to Readville, Mass. f.o.b. Readville;
Medart Co. in certain areas, Chicago
c.f. base plus c/l freight Chicago to
St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery
except Texas and Okla. Chicago, base,
f.o.b. Fort Worth, Tex.; Connors Steel Co.
shipped outside Ala., Mississippi, Louisiana,
Georgia, Florida, Tenn., Pittsburgh
base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply
Co. \$2.30 Chicago; Knoxville Iron Co.
\$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co.,
Middletown base on shipments to Detroit
or area; Parkersburg Iron & Steel Co.,
\$2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co.,
\$3.75 basing pts.; Parkersburg Iron &
Steel Co. \$3.85 Parkersburg; Apollo Steel
Co. \$3.75 basing pts.; Continental Steel
Co., Middletown base on Kokomo, Ind.,
product; Superior Sheet Steel Co., Pittsburgh
base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co.
when priced at Pittsburgh, freight to Gulf
Coast and Pacific Ports may be charged
from Chester, Pa., also to points lying
west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate
Co., maximum base price mill is \$2.45 per
100 lb., with differentials, transportation
charges, etc., provided in RPS, No. 6.



Keeps production rolling . . . "A.W."

Rolled Steel Floor Plate speeds up production by providing floors with maximum protection from costly falling accidents . . . floors that withstand punishing hours of wear. "A.W." Floor Plate is oil-proof, heat-proof, fire-proof, crack-proof. Can be installed overnight without disturbing production. Shown is the "A.W." Super-Diamond pattern which resists slipping in any direction. Pattern is uniform and can be readily matched. Write for folder.

Other products include Plates, Sheets, Billets, Blooms, Slabs—Carbon, Copper or Alloy analyses.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PENNSYLVANIA : SINCE 1826. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N.C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9817-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 9817-20	Cold Drawn, NE 9442-45 Ann.
Philadelphia	3.518	4.872 ^a	5.018 ^a	3.922	4.772	3.605	3.666	3.822	4.072	5.968	7.066	7.272	8.322
New York	3.590	4.613 ^a	5.010	3.974 ^a	4.772	3.768	3.758	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744 ^a	5.224 ^a	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.782	3.594	3.759	3.802	4.052	.....	.....	.....	.....
Norfolk	3.771	4.965	5.371	4.165	4.885	3.971	4.002	4.065	4.165	.....	.....	.....	.....
Chicago	3.25	4.20	5.231	3.60	4.651 ⁷	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337 ^a	5.272 ^a	3.737	4.7871 ⁷	3.687	3.687	3.837	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877 ^a	3.60	4.45	3.40	3.588	3.35	3.75	5.958	7.058	6.85	7.90
Buffalo	3.35	4.40	4.75 ^a	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00 ^a	3.70	4.6591 ⁷	3.608	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475 ^a	4.825 ^a	3.675	4.711	3.611	3.691	3.611	4.011	.....	.....	.....	.....
St. Louis	3.397	4.347 ^a	5.172 ^a	3.747	4.9311 ⁷	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257 ^a	3.86	4.351 ⁷	3.811 ³	3.811 ³	3.761 ³	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608 ^a	4.215	.....	4.165	4.165	4.115	4.43	.....	.....	.....	.....
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	8.08	7.18	7.18	8.23
Birmingham	3.45	.....	4.75	3.70	.....	3.55	3.55	3.50	4.43	.....	.....	.....	.....
Memphis	3.965 ⁷	4.66	3.265	4.215	.....	4.065	4.065	4.015	4.33	.....	.....	.....	.....
New Orleans	4.058 ^a	4.95	5.358	4.308	.....	4.158	4.158 ^a	4.108 ^a	4.629	.....	.....	.....	.....
Houston	3.763	5.573	6.313 ¹	4.313	.....	4.25	4.25	3.75	6.373 ^a	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20 ^a	8.10 ^a	4.95	5.613 ¹⁵	4.95	4.85	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.551 ⁴	7.30 ^a	6.35 ^a	4.501 ⁴	7.333 ¹⁷	4.651 ⁴	4.351 ⁴	4.151 ⁴	5.333	8.304	9.404	9.404	10.454
Seattle	4.651 ¹²	7.05 ^a	5.95 ^a	4.251 ²	.....	4.751 ²	4.451 ²	4.351 ²	5.783	.....	9.404	.....	.....
Portland	4.651 ¹¹	6.60 ^a	5.75 ^a	4.751 ¹¹	.....	4.751 ¹¹	4.451 ¹¹	4.451 ¹¹	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.531 ⁷	.....	6.171 ⁸	5.531 ⁷	.....	4.981 ⁷	4.981 ⁷	4.881 ⁷	5.90	.....	.....	.....	.....

MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 1330	0.10 ⁴	\$2.00	.....	.....	NE 9415	0.75 ⁴	\$15.00	\$1.25	\$25.00
NE 1335	0.10	2.00	.....	.....	NE 9417	0.75	15.00	1.25	25.00
NE 1340	0.10	2.00	.....	.....	NE 9420	0.75	15.00	1.25	25.00
NE 1345	0.10	2.00	.....	.....	NE 9422	0.75	15.00	1.25	25.00
NE 1350	0.10	2.00	.....	.....	NE 9425	0.75	15.00	1.25	25.00
NE 8612	0.65 ⁴	\$13.00	\$1.15	\$23.00	NE 9427	0.75	15.00	1.25	25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00	NE 9722	0.65 ⁴	\$13.00	\$1.15	\$23.00
NE 8640	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8642	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70 ⁴	\$14.00	\$1.20	\$24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9753	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9756	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8725	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8727	0.70	14.00	1.20	24.00	NE 9830	\$1.30	\$26.00	\$1.80	\$36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00	NE 9912	\$1.20	\$24.00	\$1.55	\$31.00
NE 9255	0.40 ⁴	\$8.00	.....	.....	NE 9915	1.20	24.00	1.55	31.00
NE 9260	0.40	8.00	.....	.....	NE 9917	1.20	24.00	1.55	31.00
NE 9261	0.65	13.00	.....	.....	NE 9920	1.20	24.00	1.55	31.00
NE 9262	0.65	13.00	.....	.....	NE 9922	1.20	24.00	1.55	31.00
					NE 9925	1.20	24.00	1.55	31.00
					NE 52100A	.....	.....	\$2.60	\$52.00
					NE 52100B	.....	.....	2.60	52.00
					NE 52100C	.....	.....	2.60	52.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip, and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 400 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (19) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton
Old range, bessemer, 51.50 \$4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50 4.60
Mesaba, non-bessemer, 51.50 4.45
High phosphorus, 51.50 4.35
*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF₂ Content: Base price per short ton
70% or more \$33.00
65% but less than 70% 32.00
60% but less than 65% 31.00
Less than 60% 30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Re-rolling

Base per gross ton, f.o.b. mill... \$31.00
 Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., \$34.25. Pgh. Steel Co. \$33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00
 Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports. Pgh. Steel Co. \$38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00
 Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (re-rolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton

Re-rolling... \$34.00
 Forging quality... 40.00
 For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton... 54.00
 Price delivered Detroit \$2.00 higher; E. Michigan \$3.00 higher.

Shell Steel

Per Gross Ton

3 in. to 12 in.... \$52.00
 12 in. to 18 in.... 54.00
 18 in. and over... 54.00
 Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton

Open hearth or bessemer... \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared... 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland... 2.00c.

Worcester, Mass... 2.10c.

Birmingham... 2.00c.

San Francisco... 2.50c.

Galveston... 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher.

Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.

High speed... 67c.

Straight molybdenum... 54c.

Tungsten-molybdenum... 57 3/4c.

High-carbon-chromium... 43c.

Oil hardening... 24c.

Special carbon... 22c.

Extra carbon... 18c.

Regular carbon... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 1c. higher.

Clean Castings

save money...



STRONG TAKES the same well earned pride in its cleaning operations that it has for its annealing facilities. In addition to the cutting, grinding and chipping processes, Strong operates three sandblasts with the larger one capable of handling any casting which comes from its 15 by 19 foot annealing furnace.

All of which adds up to a standard of castings which are much easier to machine—because the steel making, the molding, the annealing and the cleaning are all handled by Strong quality controls that safeguard the buyer's interest at all stages of the work. The surest way to have stronger castings is to have them Strong-cast!

STRONG IN NAME
 STRONG IN FACT

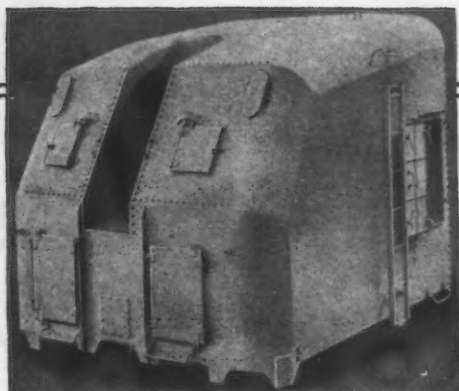
STRONG STEEL FOUNDRY COMPANY, BUFFALO, N.Y.



Strong

TENSILE STRENGTH • ELONGATION

GUN TURRETS
built of heavy armor plate, for use aboard United States Navy vessels... fabricated on Brandt assembly lines.



*Heavy Plate
or Light Sheet—*

Call **BRANDT** of Baltimore

for Precision in Heavy Plate and Sheet Steel Work

Here is an 8½ acre plant... with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications... from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. Extensive war contracts necessarily limit our present acceptance of new business for immediate delivery. For information, address: Charles T. Brandt, Inc., Baltimore-30, Maryland.



BRANDT of Baltimore—Craftsmen in Metal Since 1890

For Purchasing Agents, Buyers, Foremen, Superintendents

A BOOK CONTAINING THE FOLLOWING TABLES:

(Size 5½ x 8½)

Mensuration, Trigonometric Functions, Areas, Volumes, Lengths of Arcs, Weights of Materials, Standard Gauges of Sheets, Plates and Wires, Weights and Areas of Square and Round Bars, Weights of High Speed Steels, Gauge Thicknesses, Expansion by Heat, Electroplating Information, Color Codes for Steel, Machineability Ratings, Hardness Conversion Charts, Cutting Speeds, etc.

Send your request to

GENERAL REFINERIES, INC.

27 NORTH 4TH STREET, MINNEAPOLIS 1, MINN.

P. O. BOX 1124

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200.00 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	61
¾ in.	66½	65
1 to 3 in.	68½	67½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	44½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago...	\$54.30
6-in. and larger, del'd New York...	52.20
6-in. and larger, Birmingham...	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles...	69.40
6-in. and larger f.o.b. cars, Seattle...	71.20
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall, Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Cold Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04
2½ in. o.d. 12 B.W.G.	20.31	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50
3½ in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54

(Extras for less carload quantities)
40,000 lb. or ft., and over... Base
30,000 lb. or ft. to 39,999 lb. or ft. 5%
20,000 lb. or ft. to 29,999 lb. or ft. 10%
10,000 lb. or ft. to 19,999 lb. or ft. 20%
5,000 lb. or ft. to 9,999 lb. or ft. 30%
2,000 lb. or ft. to 4,999 lb. or ft. 45%
Under 2,000 lb. or ft. 65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Coast Basing Points†
	Base per Keg	
Standard wire nails.....	\$2.55	\$3.05
Coated nails	2.55	3.05
Cut nails, carloads	3.85	
	Base per 100 Lb.	
Annealed fence wire	\$3.05	\$3.55
Annealed galv. fence wire ..	3.40	3.90
	Base Column	
Woven wire fence*	\$0.67	\$0.85
Fence posts, carloads ...	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barless wire ..	.70	....

*15% gage and heavier. **On 30-rod spools in carload quantities.
†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
1/4 in. & smaller x 6 in. & shorter ..	65 1/2
9/16 & 5/8 in. x 6 in. & shorter	63 1/2
3/4 to 1 in. x 6 in. & shorter	61
1 1/4 in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

1/4 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/4 to 1 1/2 in. inclusive	57
1 1/2 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts

U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller	64
1/2 in. and smaller	62
3/4 in. through 1 in.	60
9/16 in. to 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger	56

In full keg lots, 10 per cent additional discount.

Stove Bolts

Consumer

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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Cap and Set Screws

Consumer

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points ..	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	61

Freight allowed up to 65c per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

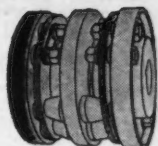
ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

THOMAS

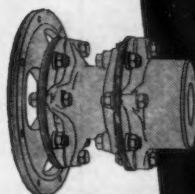
flexible **COUPLINGS**
FOR *any* SPEED OR SERVICE



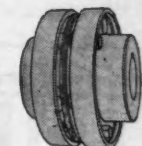
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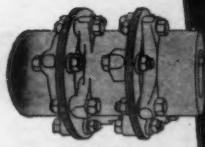
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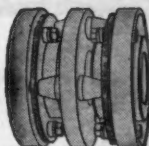
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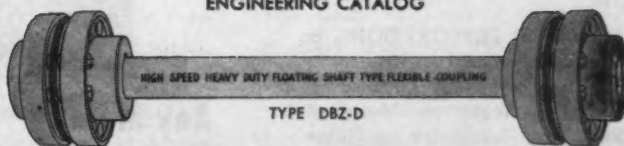
TYPE AM



TYPE MT



TYPE SS



TYPE DBZ-D

THE THOMAS PRINCIPLE ELIMINATES CHAINS, SPUR GEARS and other VIBRATING MAKESHIFTS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 1 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos- phorus	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn	27.50	27.00	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia (4)	25.84	25.34	26.84	26.34	\$30.74	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Birdsboro, Pa. (2)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	26.00	25.50	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	25.11	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.85	.....
St. Louis	24.50	24.50	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	35.46	\$37.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	32.42	.....
Hamilton, Ohio	24.00	23.50	24.50	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	32.42	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	34.00	.....
Lykes, Tenn. fc. (2)	.....	.....	.....	.....	33.00	.....
St. Paul	26.63	26.13	27.13	26.63	39.60	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	26.95	.....	.....	.....	.....	.....
San Francisco	26.95	.....	.....	.....	.....	.....
Seattle	26.95	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace\$33.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa. permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.21 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh21 1/2 to 23 1/2c

Copper, reduced, 150 and 200 mesh20 1/2 to 25 1/2c

Iron, commercial, 100 and 200 mesh, 96 + % Fe13 1/2 to 15c

Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots4c

Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots63c

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe, 30 to 33c

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe42c

Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe90c

Aluminum, 100 and 200 mesh, *23 to 27c

Antimony, 100 mesh20.6c

Cadmium, 100 mesh\$1

Chromium, 150 mesh\$1.03

Lead, 100, 200 & 300 mesh, 11 1/2 to 12 1/2c

Manganese, 150 mesh51c

Nickel, 150 mesh51 1/2c

Solder powder, 100 mesh, 8 1/2c. plus metal

Tin, 100 mesh53 1/2c

Tungsten metal powder, 98%-99%, any quantity, per lb.\$2.60

Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.\$2.60

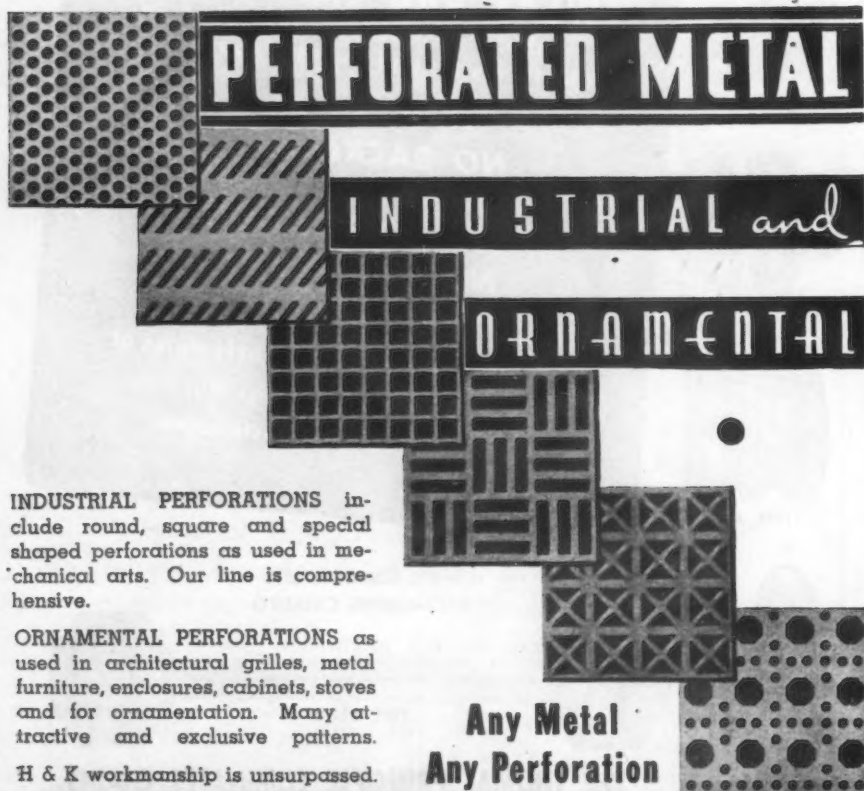
Under 100 lb.\$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd 13.35	
Chicago, f.o.b. 12.60	
New England, del'd 14.25	
Kearny, N. J., f.o.b. 12.65	
Philadelphia, del'd 12.88	
Buffalo, del'd 13.00	
Portsmouth, Ohio, f.o.b. 11.10	
Painesville, Ohio, f.o.b. 11.75	
Erie, del'd 12.75	
Cleveland, del'd 12.80	
Cincinnati, del'd 13.55	
St. Louis, del'd 13.88	
Birmingham, del'd 10.50	

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges. **Mo., Ala., and Tenn. producers—\$13.35.



PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

INDUSTRIAL PERFORATIONS include round, square and special shaped perforations as used in mechanical arts. Our line is comprehensive.

ORNAMENTAL PERFORATIONS as used in architectural grilles, metal furniture, enclosures, cabinets, stoves and for ornamentation. Many attractive and exclusive patterns.

H & K workmanship is unsurpassed.

**Any Metal
Any Perforation**

The
Harrington & King
PERFORATING CO.

5657 FILLMORE STREET, CHICAGO 44, ILL. Eastern Office: 114 Liberty Street, New York 6, N. Y.

PRICES

REFRACTORIES (F.o.b. Works)

Fire Clay Brick		Per 1000
Super-duty brick, St. Louis	.....	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	.....	51.30
First quality, New Jersey	.....	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	.....	46.55
Second quality, New Jersey	.....	51.00
No. 1, Ohio	.....	43.00
Ground fire clay, net ton	.....	7.60
Silica Brick		
Pennsylvania and Birmingham	.....	\$51.30
Chicago District	.....	58.90
Silica cement, net ton (Eastern)	.....	9.00
Chrome Brick		Per Net Ton
Standard chemically bonded, Balt.	.....
Plymouth Meeting, Chester	.....	\$54.00
Magnesite Brick		
Standard, Balt. and Chester	.....	\$76.00
Chemically bonded, Baltimore	.....	65.00
Grain Magnesite		
Domestic, f.o.b. Balt. and Chester	.....
in sacks (carloads)	.....	\$43.48
Domestic, f.o.b. Chewelah, Wash.	.....
(in bulk)	.....	22.00

RAILS, TRACK SUPPLIES (F.o.b. Mill)

Standard rails, heavier than 60 lb.	
No. 1 O.H., gross ton	.....\$40.00
Angle splice bars, 100 lb.	.....2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	.....\$40.00
Light rails (from rail steel)	.....39.00
Base per Lb.	
Cut spikes	.....3.00c.
Screw spikes	.....5.15c.
Tie plates, steel	.....2.15c.
Tie plates, Pacific Coast	.....2.30c.
Track bolts	.....4.75c.
Track bolts, heat treated, to rail-	.....
roads	5.00c.
Track bolts, jobbers discount	.....63-5
Basing points, light rails, Pittsburgh,	.....
Chicago, Birmingham; cut spikes and tie	.....
plates—Pittsburgh, Chicago, Portsmouth,	.....
Ohio, Weirton, W. Va., St. Louis, Kansas	.....
City, Minnequa, Colo., Birmingham and	.....
Pacific Coast ports; tie plates alone—	.....
Steelton, Pa., Buffalo. Cut spikes alone—	.....
Youngstown, Lebanon, Pa., Richmond,	.....
Oregon and Washington ports, add 25c.	.....

CORROSION AND HEAT- RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	.....21.25c.	20.40c.
Bars	.....25.00c.	24.00c.
Plates	.....29.00c.	27.00c.
Structural shapes	.....25.00c.	24.00c.
Sheets	.....36.00c.	34.00c.
Hot rolled strip	.....23.50c.	21.50c.
Cold rolled strip	.....30.00c.	28.00c.
Drawn wire	.....25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets 15.725c.	16.15c.	19.125c.	23.375c.	
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip 17.00c.	17.50c.	21.00c.	35.00c.	
Cold strip 22.00c.	22.50c.	32.00c.	52.00c.	

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	.....13.00c.*
Sheets	.....19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS (Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	.....3.20c.
Armature	.....3.55c.
Electrical	.....4.05c.
Motor	.....4.95c.
Dynamo	.....5.65c.
Transformer 72	.....6.15c.
Transformer 65	.....7.15c.
Transformer 58	.....7.65c.
Transformer 52	.....9.45c.
F.o.b. Granite City, add 10c. per 100	.....
lb. on field grade to and including	.....
dynamo. Pacific ports add 75c. per 100	.....
lb. on all grades.	.....

KING RINGS • FLANGES GEAR BLANKS



BANDS



LEG OUT



LEG IN



FLATS



SQUARES



STEM OUT

King Engineering Department & extensive plant facilities are always at your service on any ring or flange problem you may have.

KING FIFTH WHEEL COMPANY

2500 NORTH SECOND STREET • PHILADELPHIA 33 • PENNSYLVANIA



How to
do better
with
less

Correct working pressure means better operation of pneumatic equipment, and frequently the correct pressure for a given operation is considerably less than full line pressure. Pressure control with Hannifin pressure regulating valves helps operators get more production on arbor presses, riveters, air chucks, cylinders, air vises, and other pneumatic ma-

chinery. Correct, most efficient working pressure is instantly available, adjustable over the entire pressure range from 150 lbs. down. Piston type design gives large volumetric capacity and sensitive, accurate regulation. Write for Regulator Bulletin 56 with full description. Hannifin Manufacturing Company, 621-631 South Kolmar Ave., Chicago 24, Illinois.

Hannifin

PRESSURE REGULATING VALVES

LEE

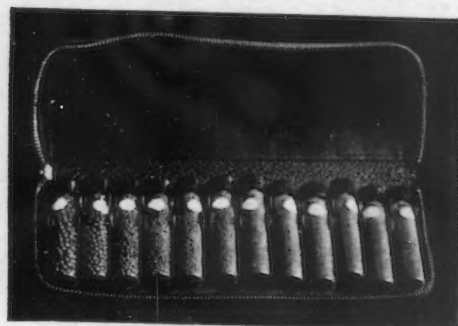
Quality Springs

ALL SHAPES • ALL SIZES • ALL MATERIALS



LEE SPRING COMPANY, Inc.
30 MAIN STREET BROOKLYN, N.Y.





← HEAT-TREATED STEEL SHOT →

**We manufacture
shot and grit for
endurance**

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

**Heat-Treated Steel Shot and
Heat-Treated Steel Grit**

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

**HARRISON
ABRASIVE
CORPORATION**
Manchester, New Hampshire

HEAT-TREATED STEEL GRIT →



PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
Carload lots (bulk) \$135.00
Carload lots (packed) 141.00
Less ton lots (packed) 148.50
Premium, \$1.70 for each 1% above 81% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk 36c.
L.c.l. lots 38c.
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.
Carload, bulk 34c.
L.c.l. lots 36c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Carloads \$35.00 \$36.00
Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si .	8.90c.	9.05c.	9.55c.
90-95% Si .	11.05c.	11.20c.	11.65c.

Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 \$)
F.o.b. Jackson, Ohio \$29.50*
Buffalo 30.75*
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorous or over.
*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk 3.35c.		3.50c.	3.65c.
2000 lb.-car-load 3.8c.		4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.
Carload, bulk 6.05c.
2000 lb. to carload 6.70c.
Under 2000 lb. 6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.... 5.80c.
2000 lb. to carload 6.30c.
Less ton lots 6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C 23.00c.	23.40c.	24.00c.	
0.10% C 22.50c.	22.90c.	23.50c.	
0.15% C 22.00c.	22.40c.	23.00c.	
0.20% C 21.50c.	21.90c.	22.50c.	
0.50% C 21.00c.	21.40c.	22.00c.	
1.00% C 20.50c.	20.90c.	21.50c.	
2.00% C 19.50c.	19.90c.	21.00c.	
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.

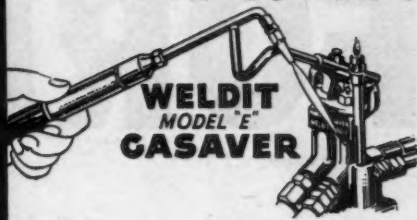
PRICES

Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4" down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, 1'a., per lb. contained tungsten, 10,000 lb. or more...	\$1.90
Ferrovandium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open Hearth	\$2.70
Crucible	\$2.80
Primus	\$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal.	\$1.50
Vanadium pentoxide, 88%-92% V ₂ O ₅ technical grade, contract basis, any quantity, per lb. contained V ₂ O ₅ . Spot sales add 5c. per lb. contained V ₂ O ₅ .	\$1.10
Ferroboreon, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload	\$1.20
Under 2000 lb.	\$1.30
Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	\$7.5c.
No. 6	60c.
No. 79	45c.
Bortrum, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	\$2.25
Under 2000 lb. lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti.	\$1.23
Less ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	\$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglio), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo.	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales	14c.
Carload lots	
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	4.6c.
Carload, bulk	
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Slmanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.75c.
Ton lots	9.25c.

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* UNIFORMITY

TIDE WATER LUBRICANIA

DEFINITION: The uniformity of a lubricant is generally understood to mean the conformity in certain specified essential qualities between two or more separate "lots", "batches", or drums of lubricant.

EXPLANATION: In general a slight variation between drums of lubricant in one or more qualities — carbon residue, pour point, specific gravity, etc. — may not have any noticeable effect on the performance of the lubricant. However, if there is a variation in more than one quality — or if the variation occurs in a quality that has a critical bearing on a specific service for which the lubricant is used (i.e., Demulsibility of Steam Cylinder Oils) — then a serious variation in lubricant performance is likely to result.

TEST: There is no single test that can be made to determine uniform-

ity. In practice, each "batch" of lubricant must conform to certain prescribed test limits. The lubricant is tested for certain specific qualities, depending on the service in which it is to be used. Tests may be made for Viscosity, Flash Point, Carbon Residue, Pour Point, Neutralization Number, Penetration, Specific Gravity, Color, or any other pertinent factors.

CONCLUSION: Most reputable refiners and marketers of lubricating oils, greases, and compounds recognize the extreme importance of maintaining uniformity. For this reason their entire manufacturing and testing procedure is scientifically conducted and strictly controlled. Regular testing by skilled technicians, using modern test equipment, provides a further means of assuring the continuing uniformity of each specific lubricant.



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